Online Restaurant Reservation System Using Data Mining Concept

by

Tuankasma Daudmareyo

Dissertation submitted in partial fulfillment of

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CERTIFICARE OF APPROVAL

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A project dissertation submitted to the

Computer Information Science Department

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In partial fulfillment of the requirement for the

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CERTIFICATE OF ORIGINALITY

This is to certify that I am responsible for the work submitted in this project, that the original work is my own except as specified in the references and acknowledgements, and that the original work contained herein have not been undertaken or done by unspecified sources or persons.

TUANKASMA DAUDMAREYO

ABSTRACT

Nowadays, online reservation system has played a significant role in many type of business operation. Therefore, to facilitate customer and owner of business where by most of operation can be made though online application. Similarly, restaurant business also needs to have online reservation system which will able to increase the sale and manage the business operation. By having restaurant reservation system the restaurant manager will be able to maximize the space and time slot for each customer's reservation. This system also aim to make the managers notice or identifies which menu is the most ordered and who is the regular visited customer in which period of time.

An analysis part of the system will be adopted some concept of data mining and CRM (Customer relationship Management). By applying these types of concept, it could help the restaurant manager to understand their business operation and to help manager to make a better future decision. The concept of data mining will customize customer's reservation data and report as useful information to the manager to understand the customer's behavior which is the most important element that will sustain an efficiency of their business in the competitive market.

ACKNOWLEDGEMENT

Throughout the progress of my Final Year Project, I would like to acknowledge my family for always being there to provide moral support to me. Thank you for all encouraged to do the best for the project.

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INTRODUCTION

1.1 Background of Study

Restaurant reservation system is a state-of-the-art Restaurant booking system that combines online bookings with automated yield management and revenue improvement with an incredibly flexible for industry-leading restaurant online system with restaurant marketing and customer behavior analysis. I have done a quick research regarding online reservation especially the online restaurant reservation system. There are few of system but most not for Malaysian region. Here is one fully online reservation system (www.restaurantdiary.com) found out that since they launched this system in September 2004, over 1,000 restaurants around the world have experienced the benefits of restaurantdiary™. Every type of operator from small independent restaurants to large chains with individual offerings uses the system on a daily basis to improve their revenues through better cover utilization, table management and customer's communication [8].

According to [7] Based on a growing number of businesses are switching on to the freedoms afforded by web-based applications such as restaurantdiary™; coupled with their state-of-the-art CRM, restaurantdiary™ is an offer that, for most businesses who try it, is too good to refuse. Their idea behind the system was to create an online tool that could radically alter the way restaurants manage covers, bookings and customers and give restaurateurs a system that improved profits, was genuinely easy-to-use, flexible enough to manage a massive range of tasks and cost effective enough for even small operators to afford.

One of a former restaurant owner and operator said "I'm familiar with the entire web booking systems, portal sites and PC-based software that is available - none of it

seemed to be able to do the job that I wanted it to". Either the software did not improve yield, was too inflexible, too difficult to use, took too long to learn - or in many cases was simply too expensive. Currently, online application seems to be most efficient tool for business operation. By develop online reservation system, it will offers guaranteed profit improvement, marketing, customer service, bookings and table management in one unique package. It's like having the most efficient and most skilled restaurant manager at your side everyday [8].

1.2 Problem Statement and Project Motivation

1.2.1 Problem Statement

Currently, in Malaysia there is no specific online restaurant reservation system successfully notified the most and less popular ordered menus from customers that have been implemented by using Data Mining concept. The problem faced when the restaurant operator or manager needs a lot of time and effort to analyze the restaurant operation within daily or monthly. He really needs a system that could help him to analyze the restaurant transaction and in the same time can be generate an analysis that contains customer's behavior information as well as the business transaction by the system it's self. Furthermore the current online restaurant reservations are still very expensive (non-openSource) and it not including a financial analysis to the restaurant manager

1.2.2 Project Motivation

The idea of developing online-Restaurant Reservation system is came from an opportunity to meet one of the restaurant managers. In the meeting we have a short discussion about the existing system that has been applied in the current business transaction. Many of problems and difficulties have been raised in the discussion and this give the idea for me to design a system that will be able to overcome the problem or reduce the difficulties to the restaurant operators.

1.3 Aim Purpose and Objectives

After identifying the problems that the restaurant operators faces with mentioned problems, I have came out with several aim /objective that will provide a system that can facilitate both restaurant operators and customers in order to make a reservation. The objectives are:

1. To develop customers with quality services, convenience customer with online reservation using IT solution.

2. To generate the restaurant operators to notify the most and less popular ordered menu by giving an analysis using data mining concept.

3. To analyze those starting a restaurant and a restaurant operators to maximize the potential of every cover and time slot in the restaurant and eliminate "no shows"

4. The application that makes it easy to manage reservations, maintains a customer database, and tracks the business transaction.

1.4 Scope and Other Areas of Study

As the developer consider for some constraints and time limitation, this project has planned to start off with narrow scope. However, base upon the progress by developer, the scope can be extended to some other area in UTP. The scope of the study will be focusing on those who are starting a restaurant and restaurant operators that need an online reservation system that using data mining element. The areas of interest are:

i) The business process of online-restaurant reservation
ii) The interface of the system
iii) MySQL
iv) PHP
v) The compatibility of new system with old platform.

CHAPTER 2

LITERATURE REVIEW

2.1 Overview

The following literatures were selected and reviewed as they are providing the useful information to the project.

2.2 Reservation System

A computer reservations system (CRS) is a computerized system used to store and retrieve information and conduct transactions related to any kind of reservation or booking. First developed and operated by airlines, CRSes were later extended for the use of travel agencies. Major CRS operations that book and sell tickets for multiple airlines are known as global distribution systems (GDS). Airlines have divested most of their direct holdings to dedicated GDS companies, who make their systems accessible to consumers through Internet gateways. Modern GDSes typically allow users to book hotel rooms and rental cars as well as airline tickets. They also provide access to railway reservations in some markets although these are not always integrated with the main system. Currently most of business operation have adapted to this future of technology and have transformed fully to Online Reservation system. This is because most of activities can be done or manage through web browser [1].

Refer to [2] In the early days of American commercial aviation, passengers were relatively few, and each airline's routes and fares were tightly regulated by the Civil Aeronautics Board. These were published in a volume entitled *The Official Airline Guide*, from which travel agents or consumers could construct an itinerary, then call or telex airline staff, which would mark the reservation on a card and file it. As demand for air travel increased and schedules grew more complex, this process became impractical. This system was used in the hospitality branch [3].

In 1953, Trans-Canada Airlines (TCA) started investigating a computer-based system with remote terminals, testing one design on the University of Toronto's Manchester Mark 1 machine that summer. Though successful, the researchers found that input and output was a major problem. Ferranti Canada became involved in the project and suggested a new system using punched cards and a transistorized computer in place of the unreliable tube-based Mark I. The resulting system, started operation in 1962, and took over all booking operations in January 1963. Terminals were placed in all of TCA's ticketing offices, allowing all queries and bookings to complete in about one second with no remote operators needed.

In 1976, United began offering its Apollo system to travel agents for reservation; while it would allow the agents to book tickets on United's competitors, the marketing value of the convenient terminal proved indispensable. SABRE, PARS, and DATAS were soon released to travel agents as well. Following airline deregulation in 1978, an efficient CRS proved particularly important; by some counts, Texas Air executive Frank Lorenzo purchased money-losing Eastern Air Lines specifically to gain control of its SystemOne CRS.

European airlines also began to invest in the field in the 1980s initially by deploying their own reservations systems in their homeland. Propelled by growth in demand for travel as well as technological advances which allowed GDSes to offer ever-increasing services and searching power. In 1987, a consortium led by Air France and West Germany's Lufthansa developed Amadeus, modeled on SystemOne. Amadeus Global Travel Distribution was launched in1992. In 1990, Delta, Northwest Airlines, and Trans World Airlines formed Worldspan, and in 1993, another consortium (including British Airways, KLM, and United Airlines, among others) formed the competing company Galileo International based on Apollo. Numerous smaller companies as KIU, have also formed, aimed at niche markets the four largest networks do not cater to; as the Low Cost Carrier (LCC) segment and small and medium size domestic and regional airlines as well.

2.3 Central Reservation System (CRS)

Central reservation System is designed for the booking and advance booking especially for hotels/ resorts and all facilities related to that like traveling and more. This system will automatically notify immediately to customers via email or SMS as a part of confirmation of booking and the same notification will be received vice-versa.

This will also help the industry in integrating the same as alert/warning system. One can configure alerts on any step of any operation. The end-user will receive alerts on different events. We can trigger alerts on the screen or through the internal requests system. It shows the right information at the right time for each user.

Advantages of Central Reservation System (CRS)

- Tour-planning and execution becomes easier for guests/tourists.
- Booking Alert / Trigger help to manage current operations easier.
- Helps build customer repot as all their details stored and remembered regularly.
- Any events can be successfully managed due to advance planning.
- Admin work smoothens as all kinds of bookings are covered.

Futures of Central Reservation System (CRS)

- Multiple Booking Options customers/tourists/guests.
- Event Management Module.
- Fully Customizable.
- Unique alert system for customer details.
- Various reports.
- Multiple agency operations.

Benefits of Central Reservation System (CRS)

- Pre planned work leads to success to any events.
- Customer satisfaction brings more business.
- Sets example of service oriented approach.
- Power of managing the company real time inventory and rates.
- Increase in company confidence via up-to-date information.
- Commission based business will cost company less.
- Negotiated and contracted rates and sales management.
- Single point control of all channels instantly and easily.

Example of Central Reservation System (CRS)

- Airline reservation
- Hotel reservation
- Tour agencies reservation
- Restaurant reservation system

Image 1: Air line Reservation System

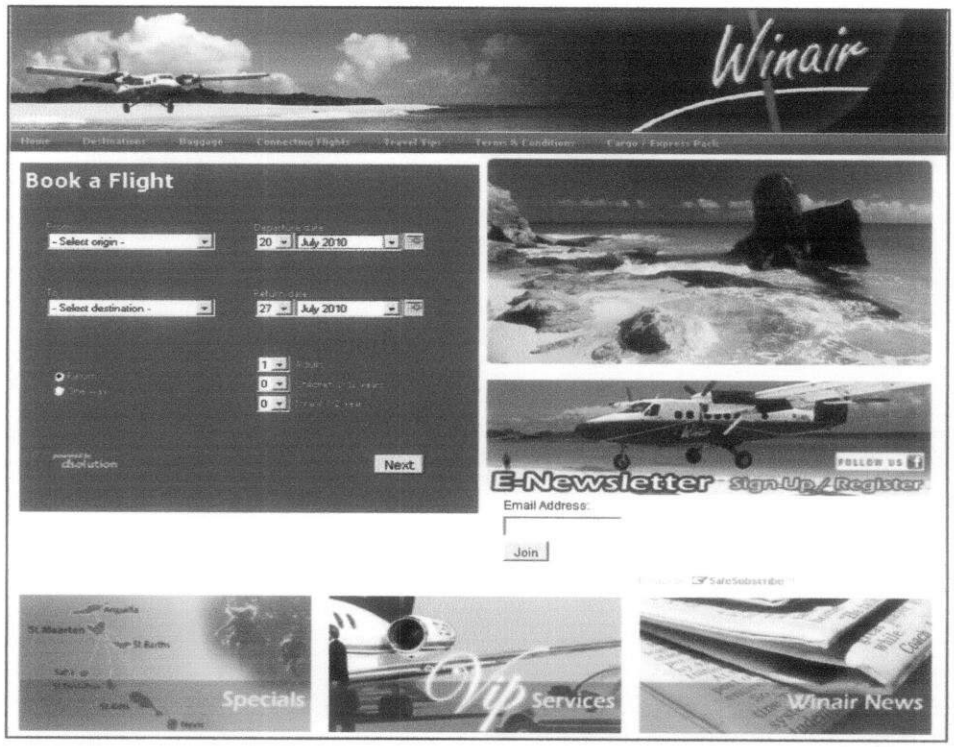


Image 2: Airline Reservation System

Image 3: Hotel Reservation System Homepage

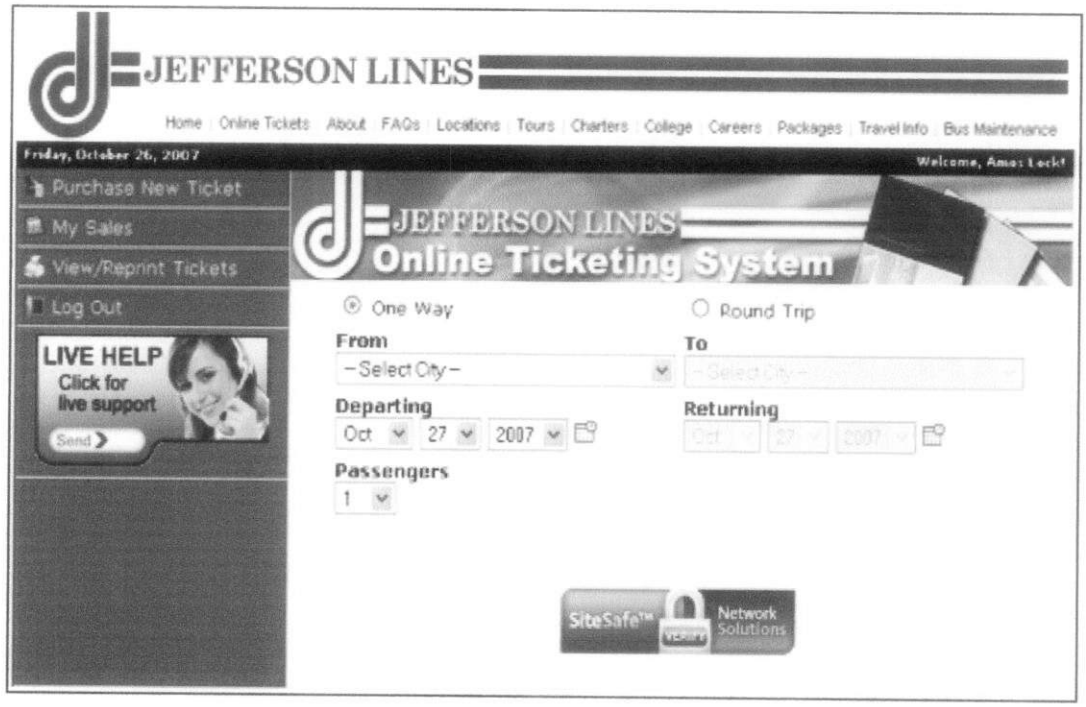


Image 4: Travel Agency ticketing Reservation System Homepage

Image 5: Travel Agency ticketing Reservation System Homepage

2.4 What is restaurant reservation system?

The Web is rapidly becoming the platform through which many companies deliver services to businesses and individual customers. The number and type of on-line services increase day by day, and this trend is likely to continue at an even faster pace in the immediate future. Examples of e-services, e-commerce and currently available include bill payment, delivery of customized news, or archiving and any kind of reservation such as restaurant. Restaurant reservation system is a state-of-the-art Restaurant booking or reservation system that combines commission online bookings with automated yield management and revenue improvement with an incredibly flexible industry-leading restaurant CRM system with restaurant marketing. [8].

According to [2] to support organizations in pursuing this reservation business opportunity they have developed eFlow, a system that supports the specification, enactment, and management of composite e-services, modeled as processes that are enacted by a service process engine. Composite e-services have to cope with a highly dynamic business environment in terms of services and of service providers. In addition, the increased competition forces companies to provide customized services to better satisfy the needs of every individual customer. Ideally, service process should be able to transparently adapt to changes in the environment and to the need of different customers with minimal or no user intervention. In addition, they stated it should be possible to dynamically modify service process definitions in a simple and effective way to manage cases where user intervention is indeed required [3].

2.4.1 Motivation of reservation system

Today, the Internet is not only being used to provide information and perform e-commerce transactions, but also as the platform through which services are delivered to businesses and customers. Indeed, more and more companies are rushing to provide all sorts of services on the Web, ranging from more ''traditional'' on-line reservations and directory services to real-time reports and even outsourcing of

entire business functions of an organization, such as the IT or human resources departments.

While today services are typically delivered individually, refer to [4] the e-service market creates the opportunity for providing value-added services that are delivered by composing existing e-services, possibly offered by different companies. In order to support organizations in pursuing this business opportunity they have developed eFlow, a platform for specifying, enacting, and monitoring composite e-services.

In addition, the characteristics of the e-service environment impose demanding requirements on a system that aims at supporting the development and delivery of composite services in an effective way. In order to stay competitive, service providers should offer the best available service at every given moment to every specific customer. Clearly, it is not feasible to continuously change the process to reflect changes in the business environment, since these occur too frequently and modifying a process definition is a delicate and time-consuming activity. But this e-service still does not apply the concept of customer relation and data mining to analyze business or customer in detail as our proposed online reservation system [1].

E-services platforms (ESP)

ESPs are the system or infrastructures that help the development, deployment, and secure delivery of eservices to businesses and customers. Examples of such platforms are HP e-speak, SUN Jini, and the forthcoming Microsoft net.1 while these platforms focus on different aspects of the problem and have different capabilities, they share many concepts and features. Basically, an ESP allows service provider to register descriptions of the services they offer and to advertise them in directories over the web. Service providers are also offered features to monitor and manage service executions [5] (See Fig. bellow).

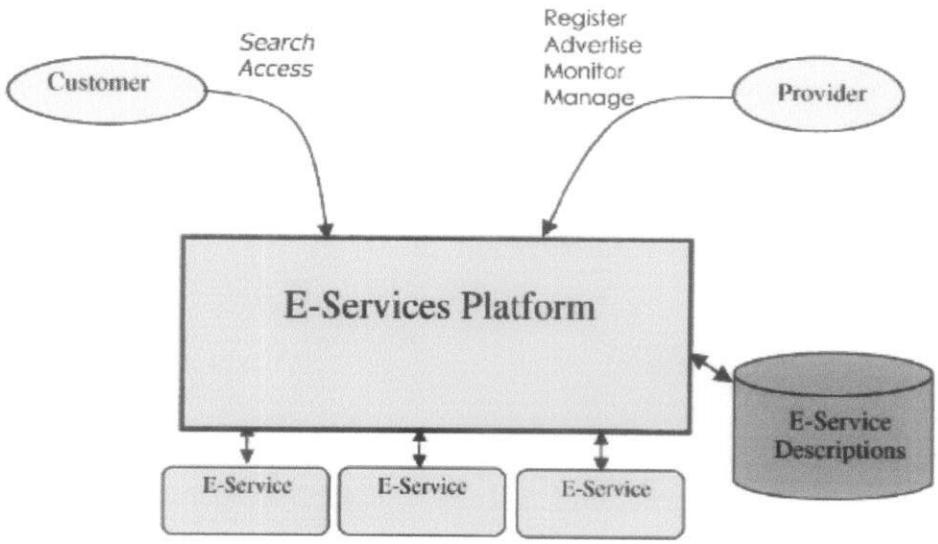


Figure 1: Main features provided by E-services platform.

In addition, most of ESP service models; a service can provide few business functions that can be invoked individually by clients. For instance, *a Restaurant service* may provide function for browsing the menus, selecting a menu, or making a reservation, as exemplified in following Fig. From an implementation viewpoint, in Jini and e-speak a service is typically a Java object, which has multiple methods corresponding to the different business functions. In e-speak a service can be also modeled as an object offering a single method, in which the different business functions are specified in terms of different XML documents that can be accepted by the method [6].

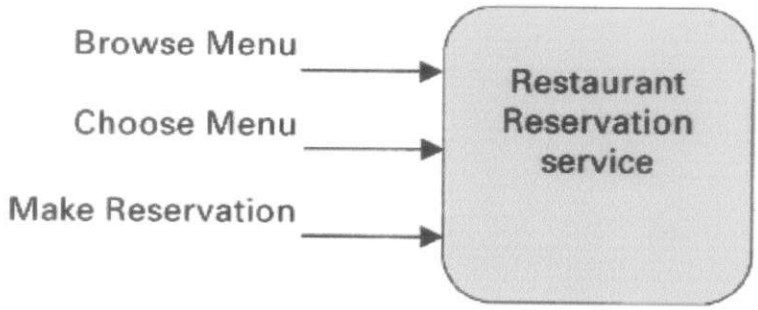


Figure 2: A service may offer several functions to customers.

The eFlow service composition model

As explained by [1] in eFlow, a composite service is described as a process schema that composes other basic or composite services. A composite service is modeled by a graph (the flow structure), which defines the order of execution among the nodes in the process. At the top level, the graph defines the flow of service invocations, and it may include service, decision, and event nodes: Service nodes represent the innovation of a basic or composite service; decision nodes specify the alternatives and rules controlling the execution flow, while event nodes enable service processes to send and receive several types of events. Arcs in the graph may be labeled with transition predicates defined over process data, meaning that as a node is completed, nodes are connected to outgoing arcs are executed only if the corresponding transition predicate evaluates to true. Most of the functions are dealing with system operation where context of any Customer behavior did not have any evaluation.

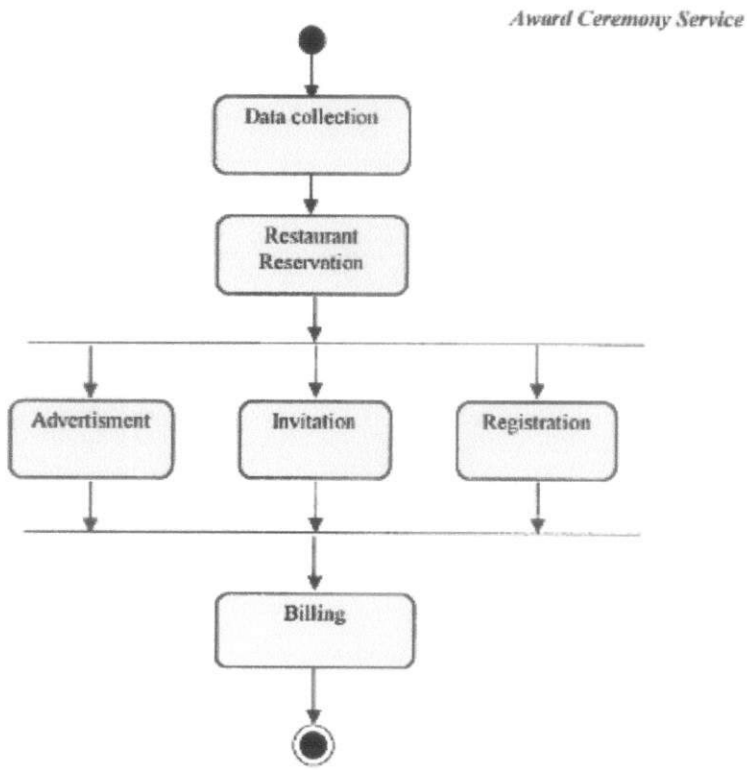


Figure 3: Award ceremony service definition

Sample available of restaurant reservation system

iMagic Restaurant Reservation is **not OpenSource** and the licence is very expensive with yearly maintenance. This software will able to manage your restaurant's reservations and walk-in with this restaurant reservation software. Currently, enter the computer age and reap the benefits of automating the reservation process. Track customers and more importantly help keep the repeat customers. With this software manager can analyze reservation trends and work towards your future needs. Rearrange reservations and allocate tables without an eraser in sight. iMagic Restaurant Reservation allows you to take reservations quickly and easily. Reservations under your complete control, rearrange tables, allocate table blocks and make prominent tables stand out with table notes [7].

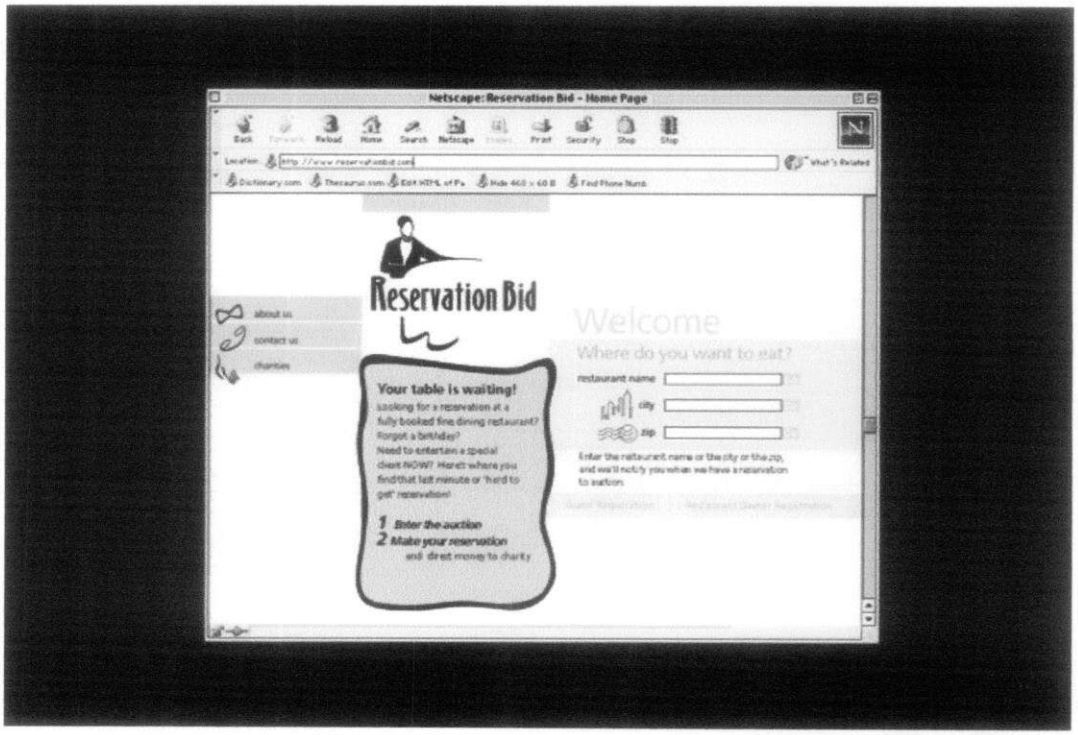


Image 6: Image of available restaurant reservation system

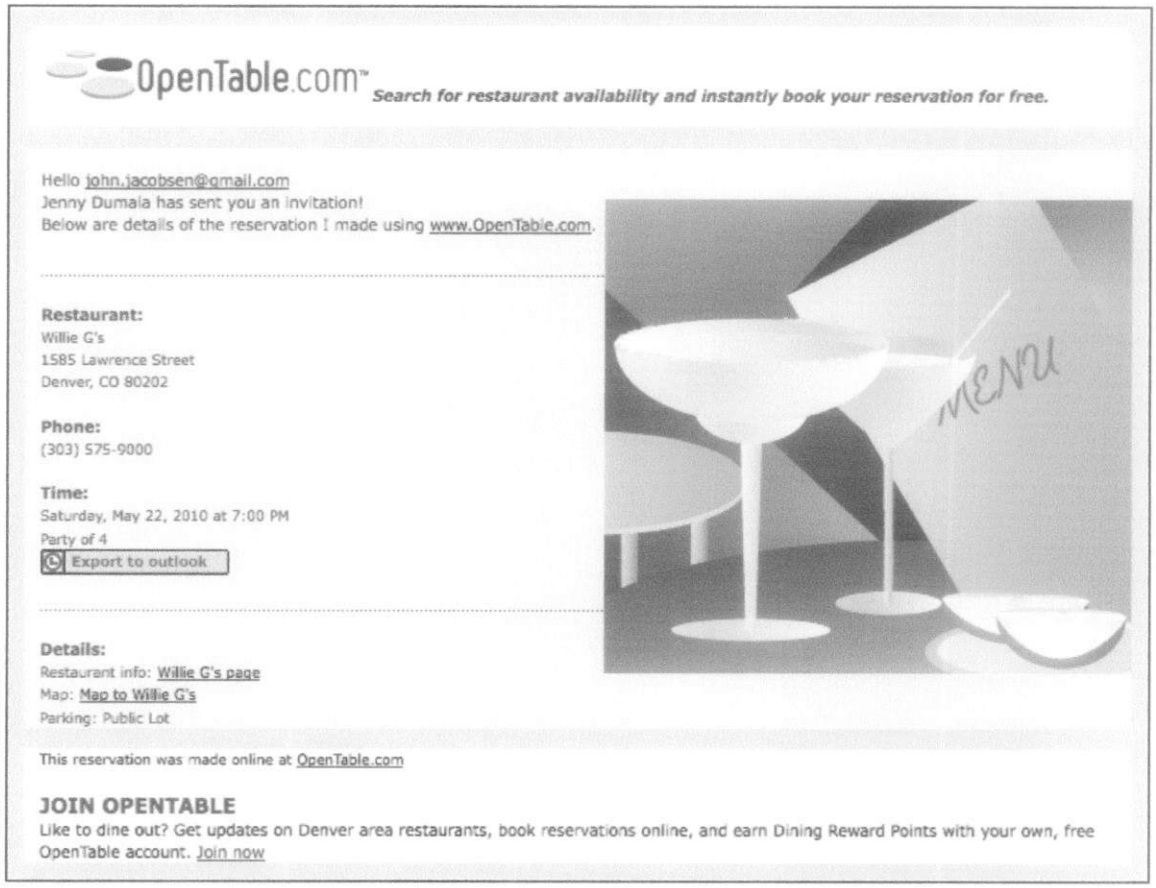


Image 7: Image of available restaurant reservation system

2.4.2 Function of the restaurant online reservation system

Increase Profit with Repeat Customers

Managing repeat customers and recording customer preferences helps you to retain your customers. Make food allergy notes, record special events and birth dates. Make your customers feel unique and special by recording personal notes. Welcome them with their nickname at the door.

Manage Reservations and Tables

Taking reservations is the core of the business, that's why they have made it so easy with iMagic Restaurant Reservation. Click Make Reservation, tap in your details, and choose from available tables done. It's not only easy and fast, it's convenient. No

matter what customers doing they can always make a new reservation.

Know whose arriving and how busy the restaurant will be

By knowing who is arriving at a glance is vital to finding guests bookings quickly. The last thing we need is to be wasting time. From our unique View Reservations screen we can see exactly who is arriving, what time and which tables they have booked. The speed and ease of this method allows them to also change the status of a reservation with a single click. This shows other members of our staffs who have arrived and who's a no show. If the restaurant operator needs to know how many wait staff to put on for an evening, It's easy with the View Reservations screen, just select the date he interested in and he will not only be able to see the details but also a Table and Cover summary for that period [7].

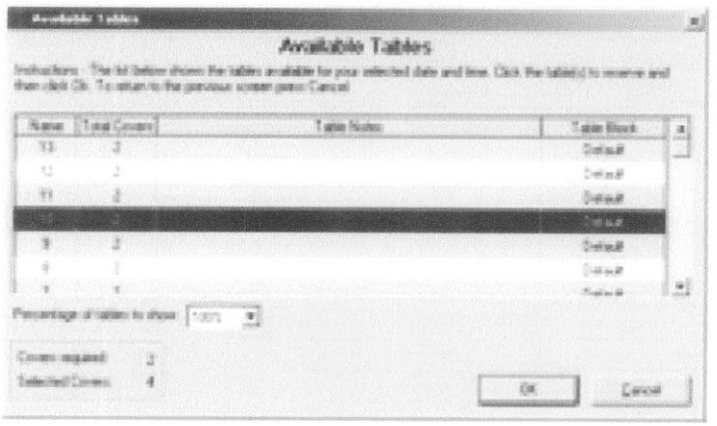


Figure 4: Example of Restaurant Online reservation system

Visual Layout

If the restaurant operator want to save time when making reservations, or if he want to find the most efficient layout of tables for the restaurant Then he able to use their Visual Layout feature, it not only allows the restaurant operator to create a graphical image of the tables in the restaurant but he can also book a table by simply clicking on

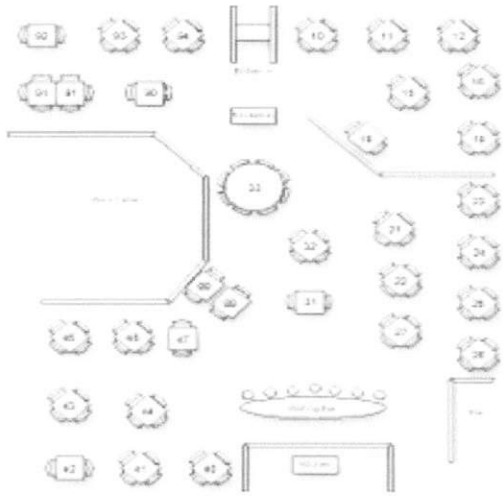


Figure 5: Restaurant Visual Layout

Interactive Reporting

With an economic down turn more than ever the restaurant operator does not want to turn away customers. Using the unique interactive reporting system the restaurant operator can increase advertising during low periods and see what staff he need when. Just click and select the dates to view, easily finding the most efficient balance.

Figure 6: Example of Online Restaurant Reservation Report

2.5 What is Data mining?

Data mining is the process of extracting patterns from data. Data mining is becoming an increasingly important tool to transform the data into information. It is commonly used in a wide range of profiling practices, such as marketing, surveillance, fraud detection and scientific discovery. [1]

Type of mining data and advantages of data mining

Data mining plays role as manager which will analyze customer reservation. First the system will get some basic information and reservation from customer and save it in database. Once he has information about reservation then system will generate some important information, such how regular the customer visited and what kind of reservation behavior of this customer then store into database. The report can be view by staff or admin to enhance the restaurant services.

Customer relationship management

According to [2] data mining in customer relationship management applications can contribute significantly to the bottom line. Rather than randomly contacting a prospect or customer through a call centre or sending mail, a company can concentrate its efforts on prospects that are predicted to have a high likelihood of responding to an offer. More sophisticated methods may be used to optimize resources across campaigns so that one may predict which channel and which offer an individual is most likely to respond to — across all potential offers. Additionally, sophisticated applications could be used to automate the mailing. Once the results from data mining (potential prospect/customer and channel/offer) are determined, this "sophisticated application" can either automatically send an e-mail or regular mail. Finally, in cases where many people will take an action without an offer, uplift modeling can be used to determine which people will have the greatest increase in responding if given an offer. Customer relationship management applications using Data clustering can also be used to automatically discover the segments or groups within a customer data set [3].

2.5.1 Why need Data mining?

Refer to [5] they apply the concept for Customer analytics is a process by which data from customer behavior is used to help make key business decisions via market segmentation and predictive analytics. This information is used by businesses for direct marketing, and customer relationship management. Marketing provides services in order to satisfy customers. With that in mind, the productive system is considered from its beginning at the production level, to the end of the cycle, the consumer. Customer analytics is playing a very important role in prediction customer behavior these days and takes place among social sciences.

How data mining and Customer relationship management related to this project?

Predicting Customer Behavior

As stated in [6] forecasting buying habits and lifestyle preferences is a process of data mining and analysis. For the Online-Reservation system use this information consists of many aspects like credit card purchases, magazine subscriptions, loyalty card membership, surveys, and menus orders. For menu orders using these categories profiles can be created for any organization's most profitable customers. Using most orders analysis, it is also possible to predict how far or often given customer will order the popular menus to each time dinning at the restaurant. Combining these sources of information, a dollar value can be placed on each restaurant within a weekly, monthly or yearly detailing will be worth to a restaurant operators. Through customer analytics, restaurant operators can make decisions with confidence because every decision is based on facts and objective data

Apply for the Future of Customer Analytics

By continuing to improve customer prediction techniques data mining will become a necessity rather than a convenient commodity for businesses to use customer analytics. With this valuable information there is an opportunity to fine-tune retail operations and store manager decisions. Rapid decision making will increase in speed and effectiveness in the future as tools and information become more easily accessible. [4].

In this project of online reservation system introduces the concept of association rule, a form of local pattern discovery in an unsupervised learning system. Association rules used to uncover relationship between inherently unrelated data items. The terminology and the process used with association rules are discussed and a brief overview of the association rule as below.

2.5.2 Association Rules Introductory Overview

In data mining, association rule learning is a popular and well researched method for discovering interesting relations between variables in large databases. Piatetsky-Shapiro [17] describes analyzing and presenting strong rules discovered in databases using different measures of interestingness [16] the goal of the techniques described in this topic is to detect relationships or associations between specific values of categorical variables in large data sets. This is a common task in many data mining projects as well as in the data mining subcategory text mining [18] these powerful exploratory techniques have a wide range of applications in many areas of business practice and also research. Based on the concept of strong rules, Agrawal et al. [19] introduced association rules for discovering regularities between products in large scale transaction data recorded by point-of-sale (POS) systems in supermarkets. For example, the rule $\{\text{onions}, \text{potatoes}\} \Rightarrow \{\text{burger}\}$ found in the sales data of a supermarket would indicate that if a customer buys onions and potatoes together, he or she is likely to also buy burger. Such information can be used as the basis for decisions about marketing activities such as, e.g., promotional pricing or product placements. In addition to the above example from *market basket analysis* association rules are employed today in many application areas including Web usage mining, intrusion detection and bioinformatics [16]

In this online reservation system, I as a developer using the Association Rule Mining as a tool for mine the large dataset to become useful information and keep as a database of a system. The classical example of a data mining problem is "market basket analysis". Stores gather information on what items are purchased by their customers. The hope is, by finding out what products are frequently purchased jointly (i.e. are associated with each other), being able to optimize the marketing of the products (e.g. the layout of the menu) by better targeting certain groups of customers [20]

Affinity analysis is a data analysis and data mining technique that discovers co-occurrence relationships among activities performed by (or recorded about) specific individuals or groups. In general, this can be applied to any process where agents can be uniquely identified and information about their activities can be recorded. In retail, affinity analysis is used to perform *market basket analysis*, in which retailers

seek to understand the purchase behavior of customers. This information can then be used for purposes of cross-selling and up-selling, in addition to influencing sales promotions, loyalty programs, store design, and discount plans [21]

2.5.2 Association Rule Mining using Market basket analysis

Overview

Market basket analysis given a database of purchase transactions and for each transaction a list of purchased items besides will find rules that correlate a set of items occurring in a list with another set of items

Market Basket Analysis

Market Basket Analysis is a modeling technique based upon the theory that if customer buy a certain group of items, they are more (or less) likely to buy another group of items [22] For example, in online reservation system, if customer order a Tom Yam and not order for a Prawn Soup, They are more likely to order Kailan Ikan Masin at the same time than somebody who not orders Prawn Soup.

The set of items a customer buys is referred to as an *itemset,* and market basket analysis seeks to find relationships between purchases.

Typically the relationship will be in the form of a rule:

IF {Prawn Soup, no Tom Yam} THEN {Kailan Ikan Masin}

The probability that a customer will order Prawn Soup without a Tom Yam (i.e. that the antecedent is true) is referred to as the *support* for the rule. The conditional probability that a customer will purchase Kailan Ikan Masin is referred to as the *confidence.*

The algorithms for performing market basket analysis are fairly straightforward (Berry and Linhoff is a reasonable introductory resource for this). The complexities mainly arise in exploiting taxonomies, avoiding combinatorial explosions (a

supermarket may stock 10,000 or more line items), and dealing with the large amounts of transaction data that may be available [22]

Examples of Market basket analysis as below:

- Market basket analysis might tell a retailer that customers often purchase shampoo and conditioner together, so putting both items on promotion at the same time would not create a significant increase in profit, while a promotion involving just one of the items would likely drive sales of the other.
- Market basket analysis can be used to divide customers into groups. A company could look at what other items people purchase along with eggs, and classify them as baking a cake (if they're buying eggs along with flour and sugar) or making omelets (if they're buying eggs along with bacon and cheese). This identification could then be used to drive other programs [21]

From the above example, Market Basket analysis concept will be applied in the online restaurant reservation system as well. For example Market basket analysis might tell a restaurant developer that customer often order Tom Yam and Kailan Ikan Masin together, so written both menu on promotion as the same order set in the menu would create a significant in profit for restaurant.

CHAPTER 3

METHODOLOGY

3.1 Overview

This chapter will discuss about the research methodology used, application of theory and tools and software used for the implementation of the prototype.

3.2 Project Methodology "Incremental Model".

The incremental model is one of Software Development Life Cycle models. It is an evolution of waterfall model. The project can be designed, implemented, integrated and tested as a series of development cycles. Cycles are divided up into smaller, more easily managed iterations. Each iteration passes through the Planning, Analysis, Design and Implementation phases as the figure shown below. This model provides working software quickly and early during the software life cycle. It is more flexible if scope and requirement have been change. It is easier to test and debug during small iteration and provide easier to manage risk because risk can be indentified and handled during its iteration. But the problem will may arise in pertaining to the database because all requirements are not gathered since the early of the project for entire software life cycle. [18]

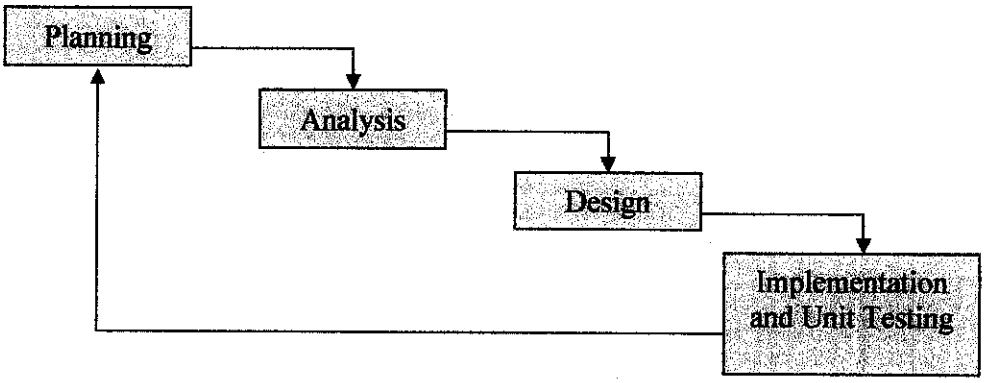


Figure 7: Incremental Life Cycle Model for Online Restaurant Reservation System

For this project, I will be the analyst, designer, implementer and the programmer since it is an Individual project. According to the time constraints for this FYP project (2 semesters), thus; I choose waterfall methodology in order to represent the development phases. I'll try to complete it phase by phase until an end product is being developed.

3.3 Project Activity

Phase	Activity
I. Planning	• Identify the system definition to be developed • Create project flow chart • Create Gantt Chart

II. Analysis	• Determine System requirement
	• Information Gathering
	• Create diagram
	• Functional Model
	  o Activity Diagram
	  o Use case Diagram
	• Structural Model
	  o Sequence Diagram
	  o Centralized Approach

III. Design	• System design • Database design • Application design • Software specification
IV. Implementation and Unit testing	• Construct the system • Create database • Create interface • Test the program • Train the users

Table 1: Project Activity

From this Project Development Method, the Project Timeline is generated according to the phases which have different tasks and activities.

Planning

During planning phase, project will be more identified into narrower and direct scope. Discussion with supervisor to find out the most possible solution was conducted. Field data was collected as actual data to be used in testing phase after project is accomplished. All required tools and software are prepared to be used in implementation and related literature and researches are reviewed for supporting project.

Analysis/ Requirement Studies

This phase is to gather and analyze information and requirements obtained from several users (patients) as well as clinics. The outcome of analysis will be created into several diagrams and will be used as input for the next design phase.

System Design

In the system design phase, system architecture, graphical user interface and prototyping will be designed according to the analysis and users' requirements.

System Development

This is the stage where the real programming work will take in place. System will start develop from system logic following by system interface and lastly the interaction between system logic and interface will be developed.

Testing

After system is implemented, there will be system testing during the testing phase. For this project we might apply 3 kinds of testing which are:

i) Unit test, to test each of the function to ensure that each function is working correctly.

ii) Load test, some testing data obtained from patients will be tested and loaded into developed system and accounting for interactions

iii) System test, in this test the developed system will be integrated with the existing platform. Testing will be conducted at the user's side.

In testing phase, if there are bugs or errors generated. The system might need to draw back to the development or design to find out the faults and to correct those errors.

Release

After testing is completed without any failures generated and system is satisfied by users, the system will be released to the users.

3.4 Tools Required

The main tools and software required for this project are listed as below:

Hardware	Software
• Personal Computer	• Local host server • Adobe Dreamweaver CS3 • Adobe Photoshop CS3 • Apache • PHP • JavaScript

3.5 Overall System Architecture

The Restaurant Reservation System (RRS) architecture is shown in Figure 2 below. The users or customer will access into the system through the internet. The internet is connected to the restaurant network; in the network may consist of 2 or more branches of restaurant. Each restaurant will have same database meanwhile staff and admin will manage their own restaurant database. Once the customers inter the information, all the information will be store in each database of the system. The customers are able to select, view and make a reservation with the branches of restaurant which they are prefer.

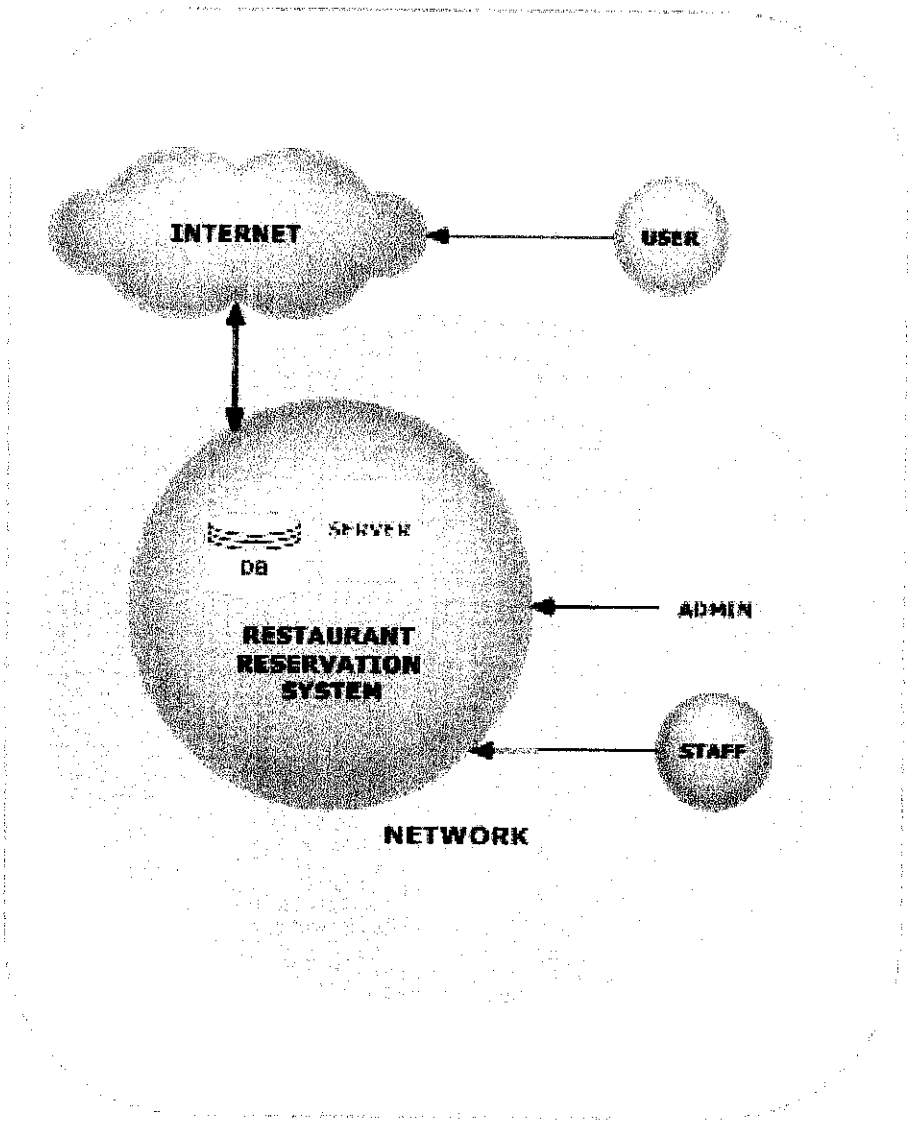


Figure 8: Overall System Architecture

3.5 Use case Diagram

Use case diagram is used to describe the functionality of the system as a model of the dialog between the actors and the system. The actor consists of four main actors and role which are Customer (new customer and old customer), system admin, staff and data mining.

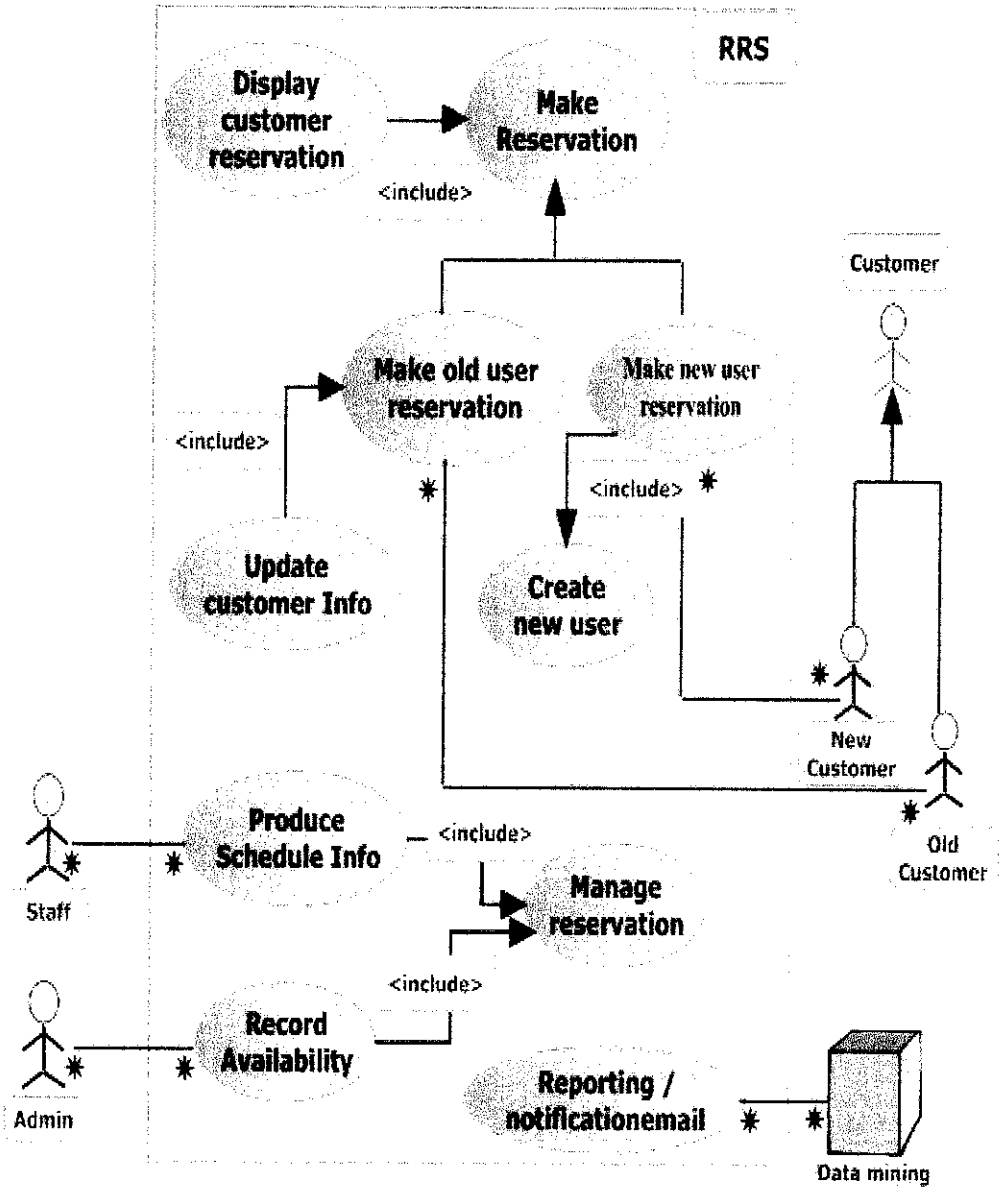


Figure 9: Use case Diagram of the new system

3.6 Data mining Model Concept

Data mining plays role as manager which will analyze customer reservation. First the system will get some basic information and reservation from customer and save it in database. Once he has information about reservation then system will generate some important information, such how regular the customer visited and what kind of reservation behavior of this customer then store into database. The report can be view by staff or admin to enhance the restaurant services. The system also allow customer to select and book preferred slot for his or her reservation. After customer has confirmed the time slot then he will send the booked slot as well as customer information to both Admin and staff. The information also will be including some analyzing detail from system for staff and admin can understand customer behavior.

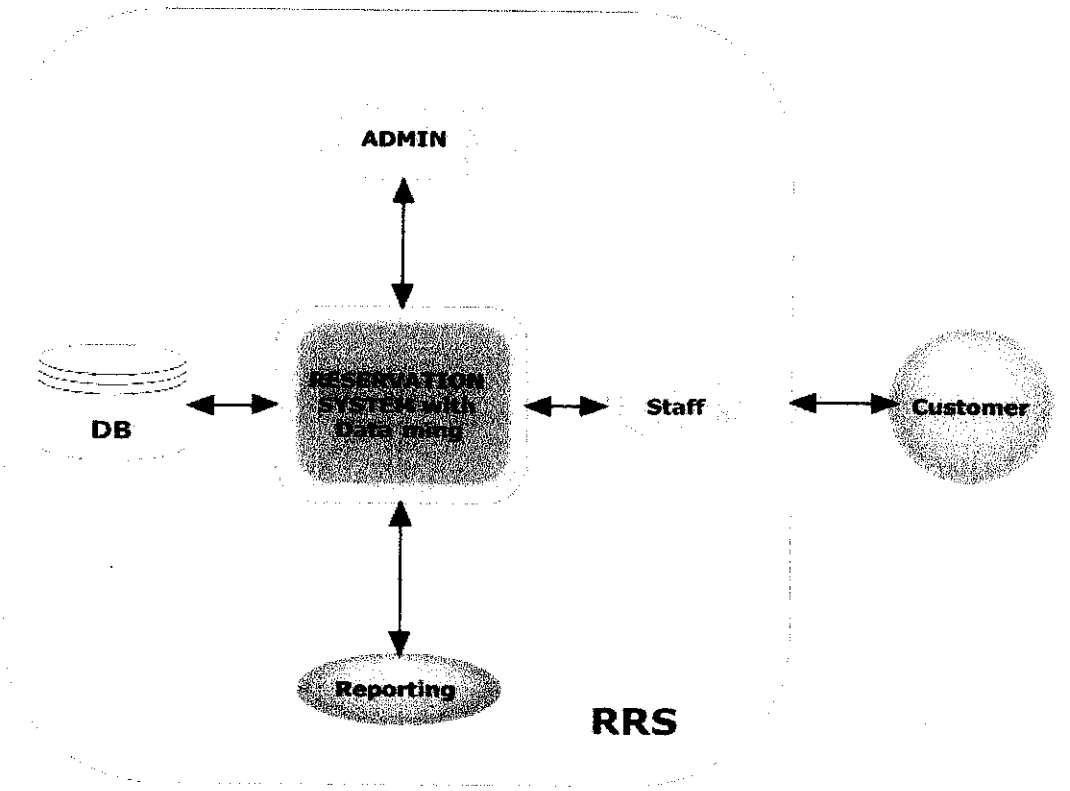


Figure 10: agent-based Model Concept

3.7 Activity Diagram

Activity diagram is used to model the behavior in a business process independent of object. This activity diagram represents part of reservation system. It scribes the primary activities and the relationships among the activities in a process of making a reservation with the customer and the system

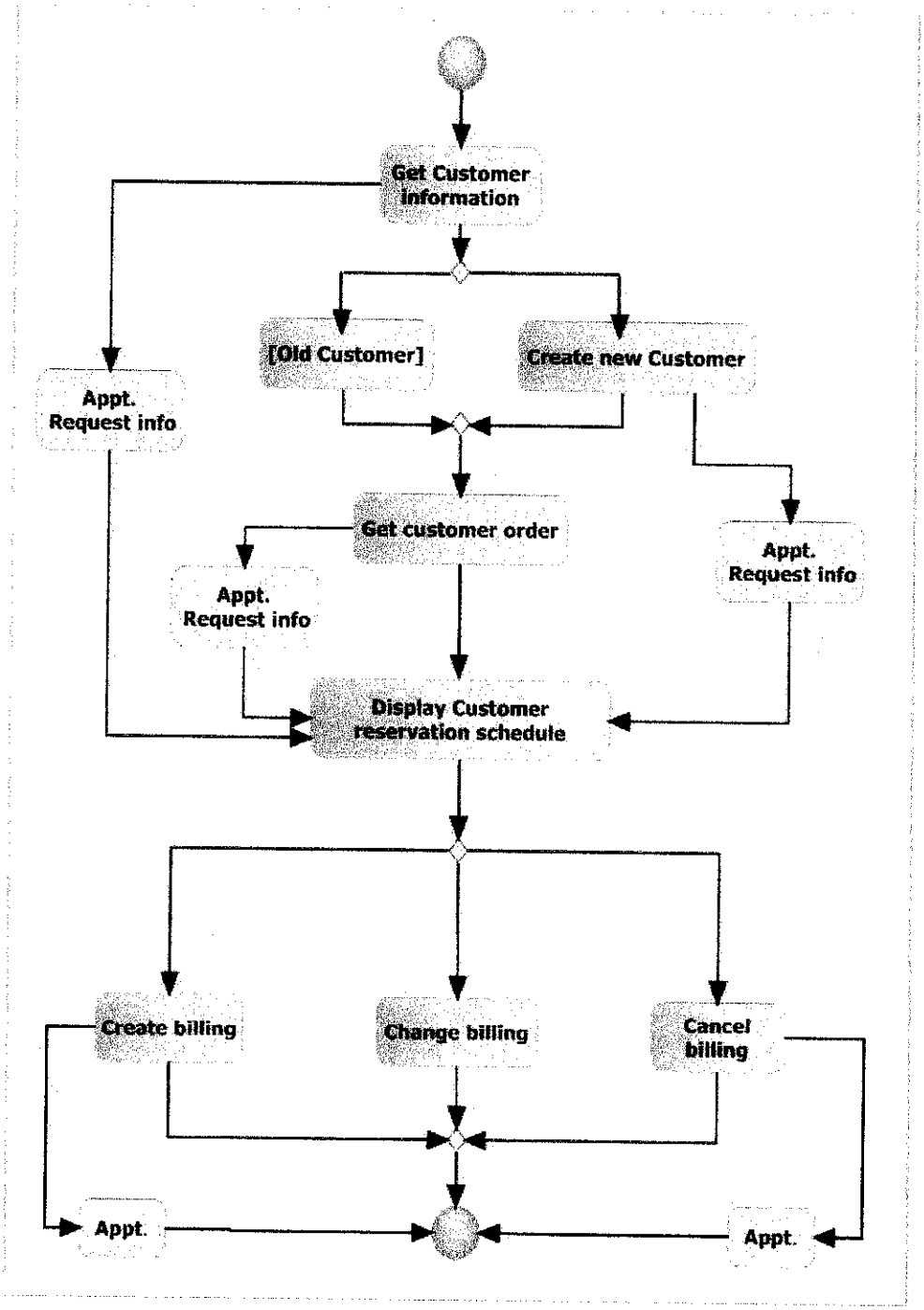


Figure 11: Activity Diagram

From the diagram above, whenever a customer needs to make reservation, they will access into the online reservation system. At the homepage of the system they need to log in by entering their username and password. If they are a new user they need to register themselves before log in by entering basic information such as first name, last name, gender, age, address, contact number and so on. After they have registered into the system, they will use their username and password to log in into the system.

Once they have logged in into the system, they are able to make reservation or order that they can manage by themselves such as table, time, food itch etc. then the system will be recorded into database after they have confirm. However all the information that has been entered by the customer, the system will keep it privacy, another customer will not be able to see it. After the system has been recorded, then the system will display the reservation schedule for customer in their booking information. The customer can book the slot that he or she prefer by click or tick at that slot. The slot that has been booked by earlier customer, another customer will not be able to click at that slot anymore until that particular date or reservation is over.

3.8 Class Diagram

This class diagram below shows the classes and the relationships among classed which are Customer, staff, booking, and table and so on, that remain constant in the system over time. This class diagram also describes classes, which include both behaviors and states, with the relationships between the classes. The primary objective of class diagram is to show the relationships, or associations, that classes have with one another.

Each class includes its attributes, for instant class Staff includes StaffID, name, jobType. Class staff consists of one subclasses action which is modifying information. Restaurant management system class consists of booking or reservation which includes few sub action as follow, add booking, modify booking and generate report. It does also apply the same concept as other type of class diagram.

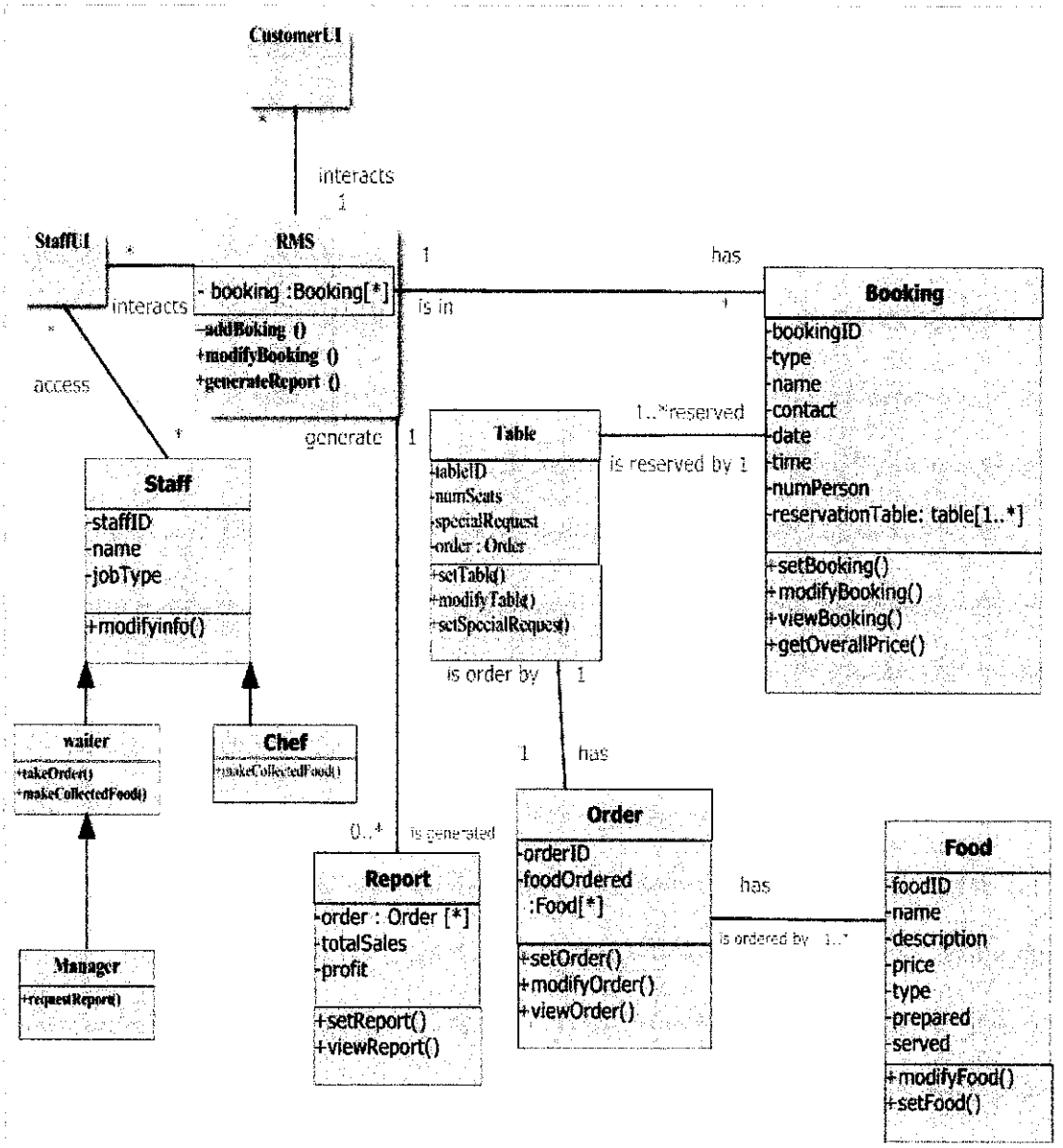


Figure 12: Class Diagram

Relationship between each class can describe as Customer can interact with the system and making the reservation. Start shown at customer side can which mean many customer can be interact with one system which show 1 at RMS side. Reservation management system can make many booking which shown start symbol at booking side. In one of each order can have many type of food.

CHAPTER 4

RESULT AND DISCUSSION

4.1.1 RESULTS OF STUDY

In term of the Evaluation study of the online restaurant reservation system, In this project have been divided to be two main part which are:

- Usability Study and
- Client Perception study
- Interview with clients

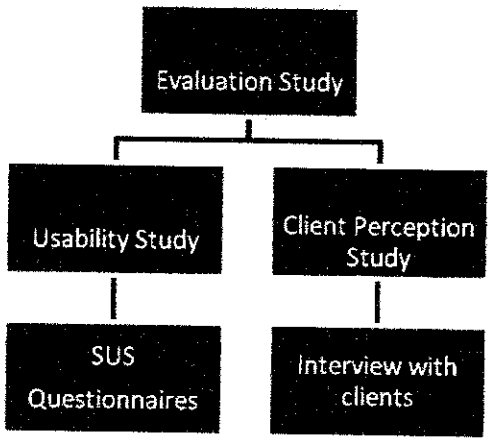


Figure 13: The system Evaluation Model

4.1.2 Usability Study

In just the same way, the usability of any tool or system has to be viewed in terms of the context in which it is used, and its appropriateness to that context. With particular reference to information systems, this view of usability is reflected in the current draft international standard ISO 9241-11 and in the European Community ESPRIT project MUSiC (Measuring Usability of Systems in Context) (e.g., Bevan, Kirakowski and

Maissel, 1991). In general, it is impossible to specify the usability of a system (i.e., its fitness for purpose) without first defining who are the intended users of the system, the tasks those users will perform with it, and the characteristics of the physical, organizational and social environment in which it will be used.

[John Brooke - SUS - A quick and dirty usability scale]

Since usability is itself a moveable feast, it follows that measures of usability must themselves be dependent on the way in which usability is defined. It is possible to talk of some general classes of usability measure; ISO 9241-11 suggests that measures of usability should cover

- effectiveness (the ability of users to complete tasks using the system, and the quality of the output of those tasks),
- efficiency (the level of resource consumed in performing tasks)
- Satisfaction (users' subjective reactions to using the system).

Usability is a narrow concern compared to the larger issue of the system acceptability, which basically is the question of whether the system is good enough to satisfy all the needs and requirement of the users and other potential stakeholders, such as the user's clients and managers.

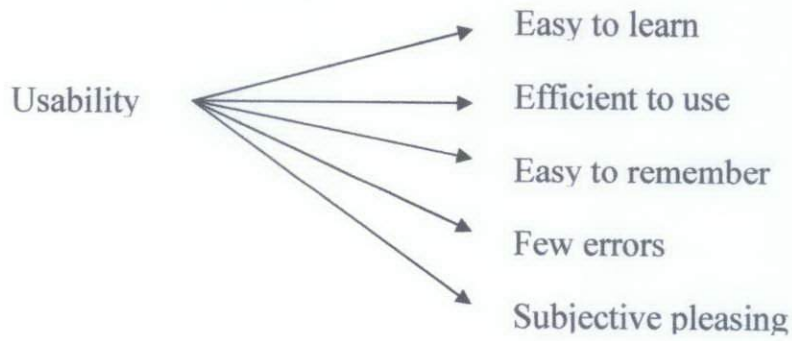


Figure 14: A model of the attribute of Usability

'Know the User'

The first step in the usability process is to study the intended users and use of the product, at the minimum, developers should visit a customer site so that they have a feel for how the product will be use. The concept of 'user' should be defined to include everybody whose work if affected by the product in some way, including the users of the system's end product or output even if they never see a single screen. [24]

'Individual User Characteristic'

It is necessary to know the class of people who will be using the system. In some situation this is easy since it is possible to identify these users as concrete individuals. This is the case when the produce is going to be used in a specific department in a particular company, For other products, users may be more widely scattered such that it is possible to visit only a few, representative customers. Alternatively, the products might be aimed towards the entire population or a very large subset.
By knowing the users' work experience, educational level, age, previous computer experience, and so on, it is possible to anticipate their learning difficulties to some extent and to better set appropriate limits for the complexity of the user interfaces [25]

SUS evaluation

In this Online Reservation System I use System Usability Scale SUS for measure the system usability. The system usability scale is described below:

SUS - the System Usability Scale

In response to these requirements, a simple usability scale was developed. The System Usability Scale (SUS) is a simple, ten-item scale giving a global view of subjective assessments of usability. SUS is a *Likert scale*. It is often assumed that a Likert scale is simply one based on forced-choice questions, where a statement is made and the respondent then indicates the degree of agreement or disagreement with the statement on a 5 (or 7) point scale. However, the construction of a Likert scale is somewhat more subtle than this. Even as Likert scales are presented in this form, the statements

with which the respondent indicates agreement and disagreement have to be selected carefully [23]

The System Usability Scale is shown in the next section of this chapter. It can be seen that the selected statements actually cover a variety of aspects of system usability, such as the need for support, training, and complexity, and thus have a high level of face validity for measuring usability of a system.

Using SUS

The SUS scale is generally used after the respondent has had an opportunity to use the system being evaluated, but before any debriefing or discussion takes place. Respondents should be asked to record their immediate response to each item, rather than thinking about items for a long time.

All items should be checked. If a respondent feels that they cannot respond to a particular item, they should mark the centre point of the scale.

Scoring SUS

SUS yields a single number representing a composite measure of the overall usability of the system being studied. Note that scores for individual items are not meaningful on their own. [23]

To calculate the SUS score, first sum the score contributions from each item. Each item's score contribution will range from 0 to 4. For items 1, 3, 5, 7, and 9 the score contribution is the scale position minus 1. For items 2,4,6,8 and 10, the contribution is 5 minus the scale position. Multiply the sum of the scores by 2.5 to obtain the overall value of SUS.

(See Appendix A- System Usability Scale SUS)

4.1 .3 SUS evaluation on 'Online Restaurant Reservation System'

During the project, there is one SUS evaluation has been conducted. The SUS is done to evaluate the prototype and is done after the prototype is finished. The SUS has been distributed to the 30 correspondents.

Demography of the correspondents

There are 30 people involved in this SUS evaluation. They are randomly selected from different race, age and gender. The correspondents are selected from 5 random restaurant owners around Taman Maju, 5 random people which might be the potential customer to the restaurant, 5 UTP staffs and 15 UTP students.

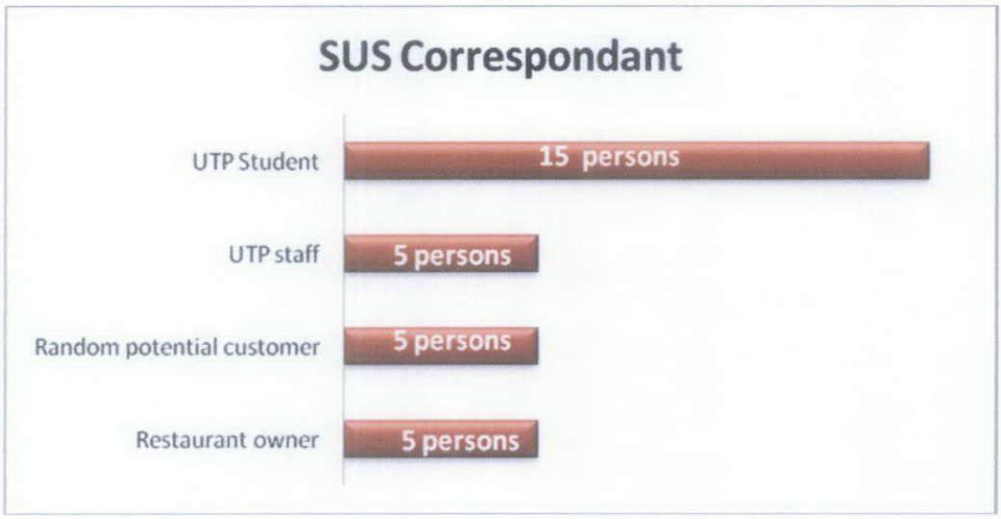


Figure15 : SUS Correspondant Bar Chart

The example of SUS evaluation form that has been distributed to all 30 users is attached here in this report in appendix chapter.

(See Appendix A- System Usability Scale SUS)

Result of System Usability Testing Result as follow:

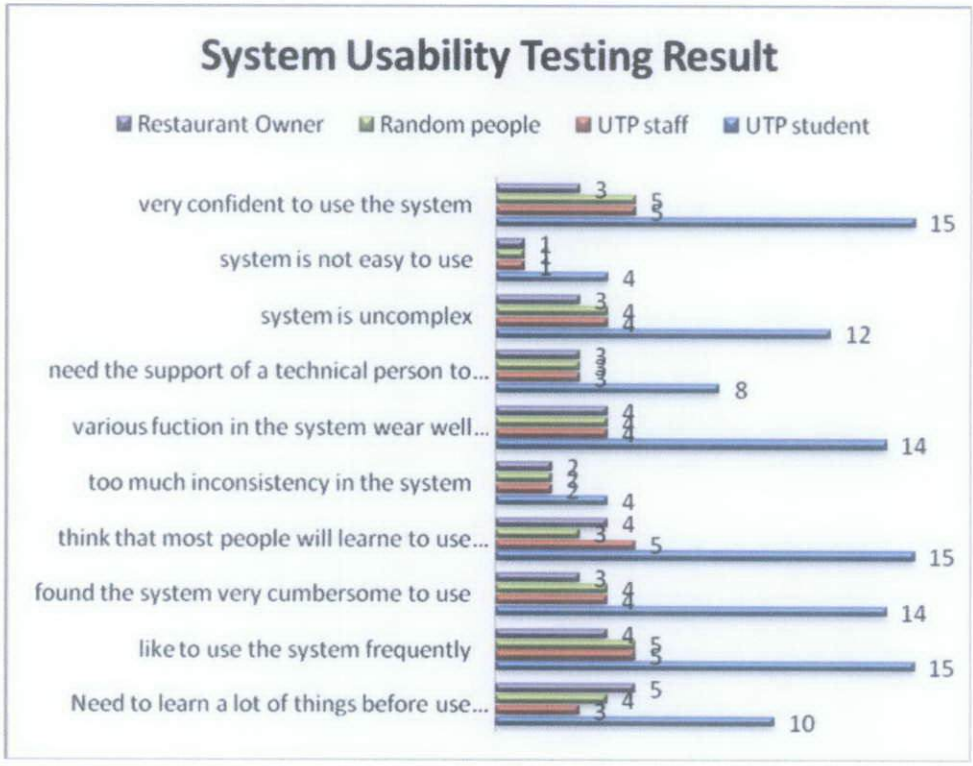


Figure16: System Usability Testing Result

4.2 Client Perception Study

A survey has been conducted to 10 restaurant operators which are 8 of them are hectic business restaurant which having their customer arriving are approximately more than 100 customer per day. Another 2 of restaurant are the less hectic business restaurant and the arriving of theirs customer are approximately less than 100 customers per day. The survey was conducted in order to obtain data on user's demography, awareness and system and user requirement. The graph and chart have been constructed and analyzed to discuss the outcome of the survey based on the survey that has been done on the middle of project development.

a. Demography of the user

Based on the survey result, 80% of the users are restaurant manager while 20% are restaurant normal staffs. And 60% of the user are having more than 1 year of work position while 40% of them are less than 1 year working position. The 80% of the

restaurant are operating more than 12 hours per day while 20% of the restaurant just only operating the business less than 12 hours.

Figure17: Position of the correspondent

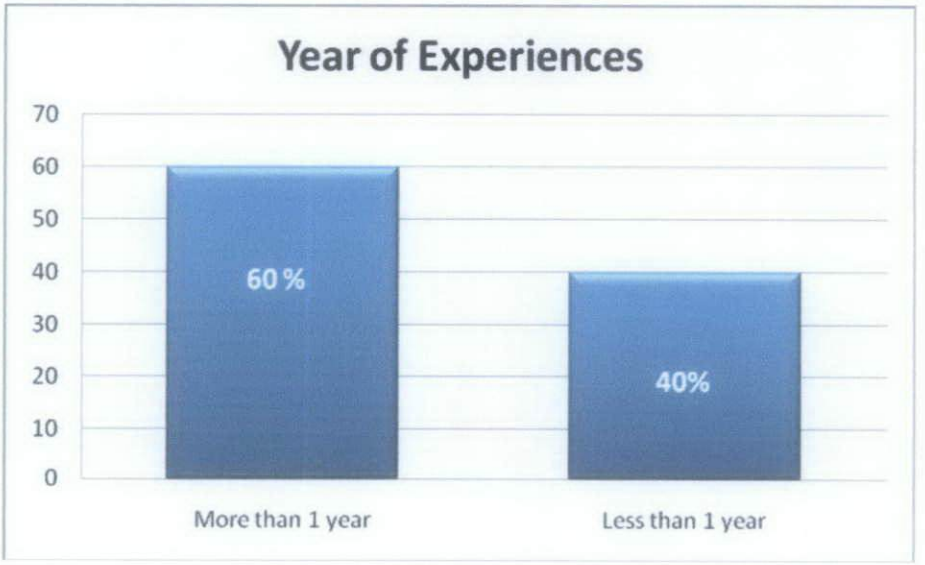


Figure18 : Year of Experiences of correspondant

Figure19: Hours of Operation/day of a restaurant

b. System requirement

1. Internet Usage

As shown in figure below 50% of the participant are very skilled in using the computer and internet. 30% is competent in using the computer and internet. Another 20% are not very skilled.

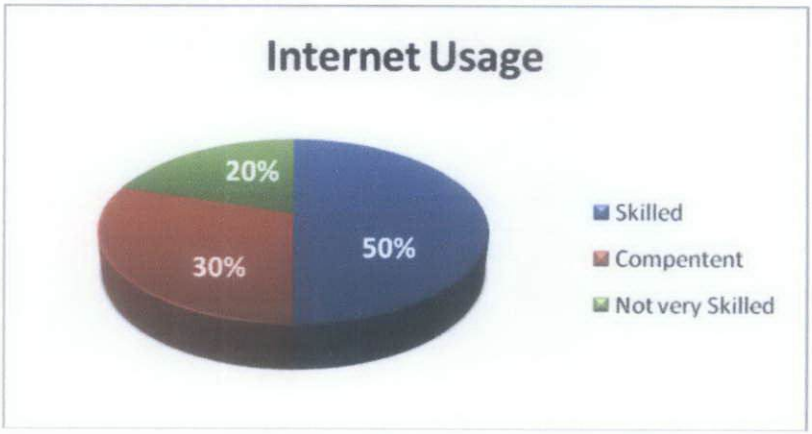


Figure20: Internet Usage

2. Familiarity of online reservation system

Based on the survey result, most restaurant operators are familiar with the online reservation system with the total of 70%. 30 of them are not familiar with the online reservation system.

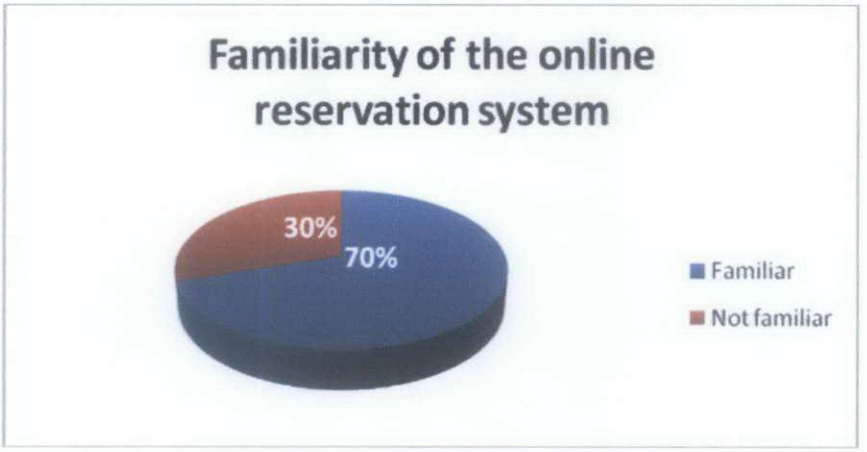


Figure 21: Familiarity of the online reservation system

3. Usefulness of system for customer's conveniences

Below show the percentage of system helpfulness. Most of the users think that the system could help customer's conveniences in total of 80% and 20% not agreed about the system is can help customer's conveniences.

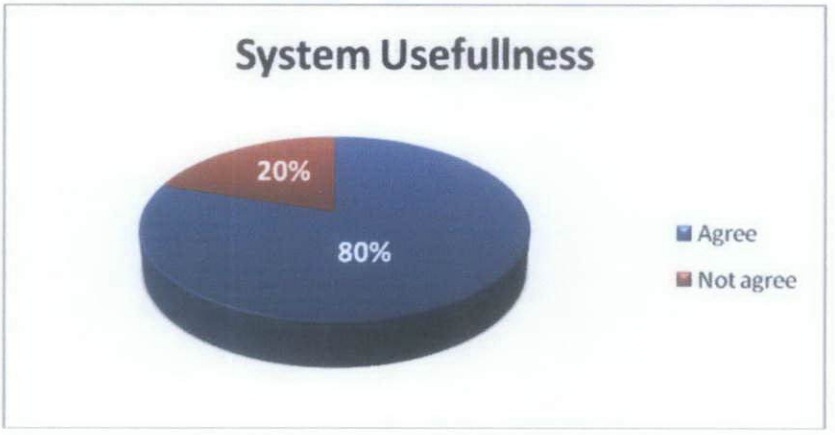


Figure 22: System Usefulness

4.3 THE PROTOTYPE

During the development of the project a prototype is able to be developed. With this, it can be as a guide in order to improve its content, interface and others.
Below is the screenshots of the system:-

Homepage Page

Home page is the first page that user will see before they have login into the system. Home page consider as the main page of the system or site with contain the information about menus , an announcement of upcoming event and upcoming promotion, restaurant location and other information that related to the restaurant

Figure 23: Homepage

Customer Login Page

Login page is the page where users need to enter their username and password before logging in into the system. For new users, they need to register before they can log in into the system by filling the registration form and they will use their username and password to login.

Figure 24: Customer Login Page

Registration Page

In registration page, there will be a registration form for new users to enter some basic Information about themselves such as username, password, name, full name, gender, email address and also home address. All the information will be saved into the database and the admin will use the information as a reference for particular customers whenever they come to the restaurant.

Figure 25: Registration Page

Customer Index Page

Customer Index page is the page where by customer that already got their account or has registered in the system. All customers need to be register to the system in order to make any reservation. The system will automatically keep their all information into the system database. Customer will be allowed to do an edit, update, change their account or remake observation by this page. Furthermore, user or customer can make an order or reservation by using this page.

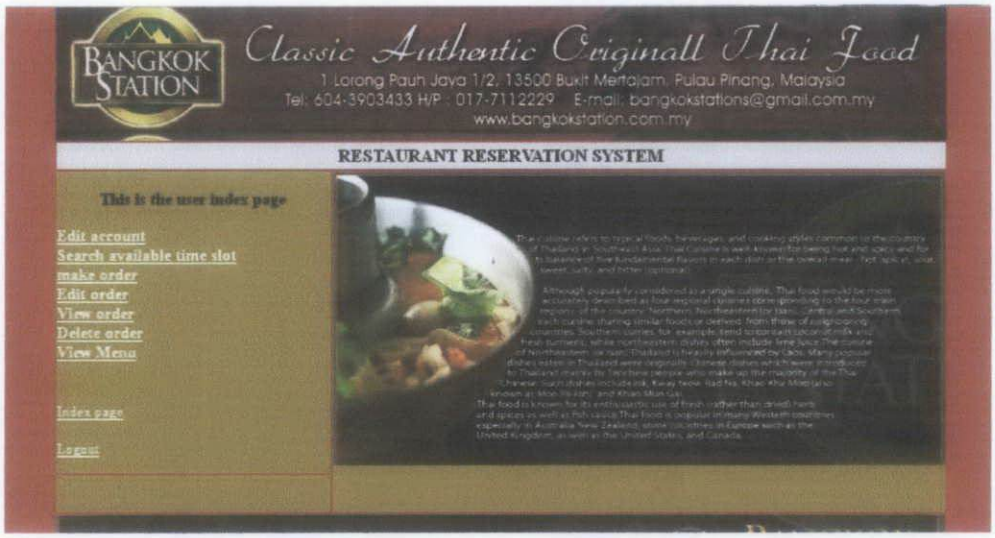


Figure 26: Customer index Page

User Edit Page

This page is to update customer information or to make some changes to the reservation. The system will be automatic save the new information by providing a reset button and submit button.

Figure 27: User Edit Page

Figure28: User View Time Slot Page

Figure 29: Menu Page

Make Reservation Page

In this page, the system will show some initial set of information. User also needs to fill in the initial information. Some of the information users are able to insert their own such as specific request of the food and drink. After have been done with all process of reservation

the successful page will show as figure bellow

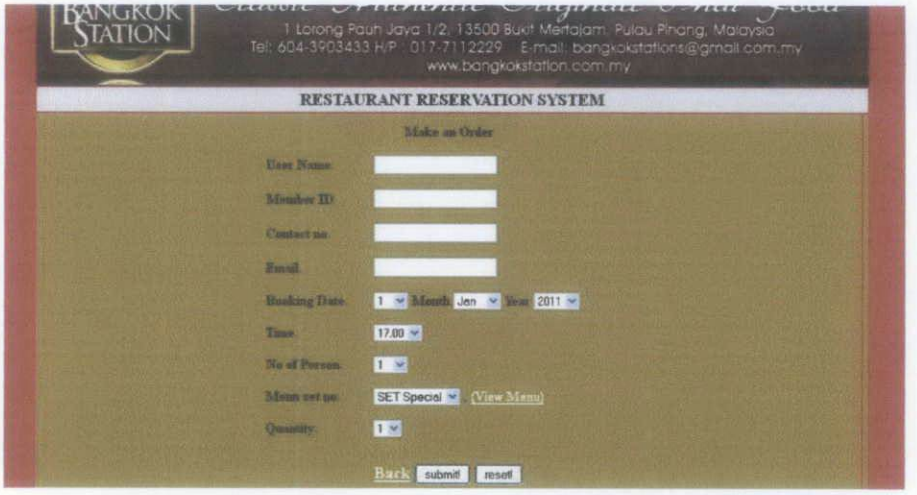
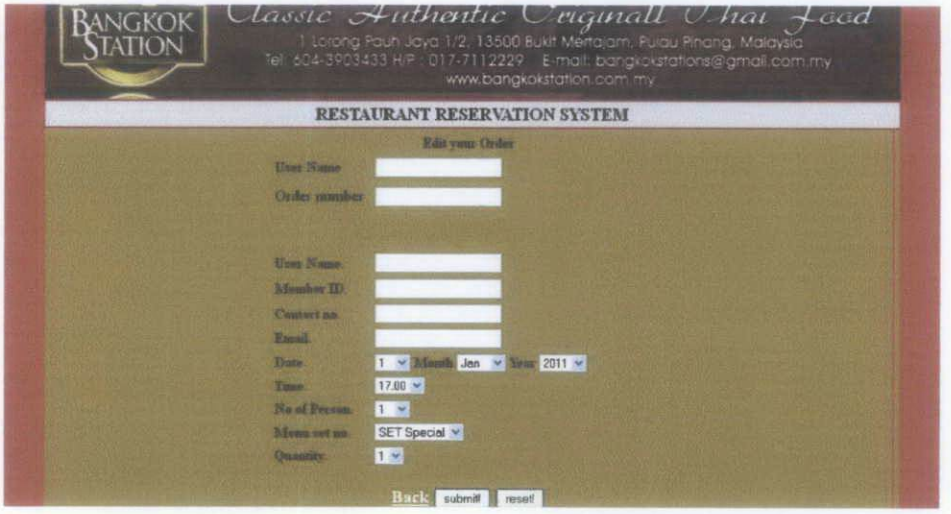


Fig Figure 30: Make Reservation Page



.Figure 31: Customer Edit Order Page

Full Booked Page and Successful Making Reservation Page

At this page the request time and date are fully book, the system will show fully booked page as figure above. The customer needs to choose another date or time in order to make a new reservation. Customer also able to view current booked date and time, this is to help them view available time before making a new reservation but they are not allow to see the detail of other person who placed an order earlier.

Figure 32: Successful Making Reservation Page

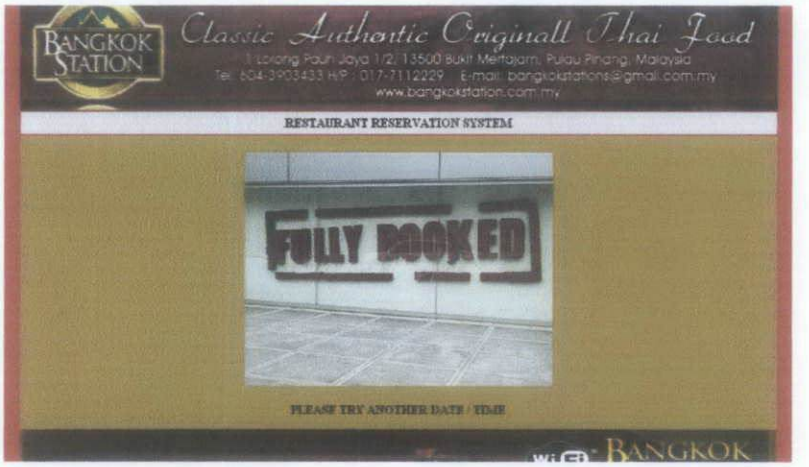


Figure 33: Full Booked Page

Customer Reservation Summary page

This page is containing the summary of the customer reservation, once the customers finish their reservation in earlier transaction, The system will generate this summary page. Customer can be view to check the confirmation, 'Back to Order page' is link that for customer to go back if there any changes in reservation system user also can go back to make edit reservation.

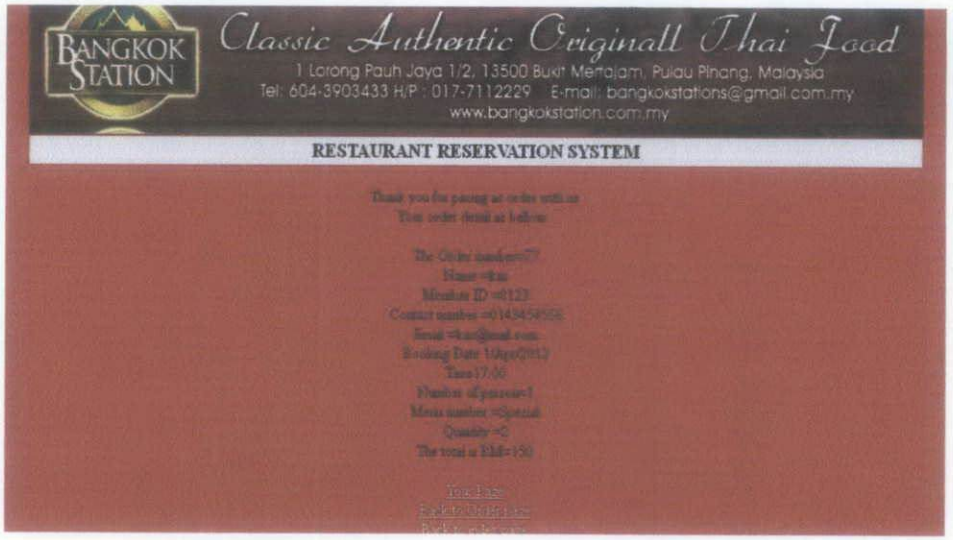


Figure 34: Customer Order Summary Page

Staff Login Page

Staff login page is the page where by staffs of the restaurant or admin of the system use to manage the reservation from the customers. An admin or staff of the restaurant have to enter their name and password in order to edit their account, view the reservation from customers and edit user order in case of that particular reservation got some changes.

Figure 35: Staff Login Page

Staff index page

Only the staff and admin are able to view full detail of reservation, Delete reservation or order, Edit staff account, and Update payment and all the report as well as all kind of mining report.

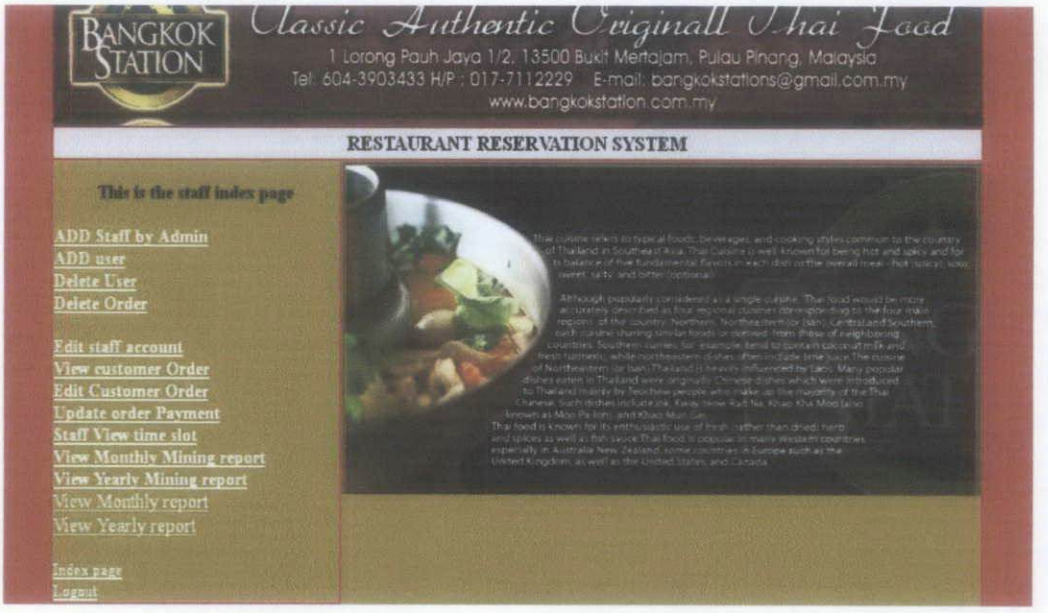


Figure 36: Staff index page

Staff Edit Page

This page is to update customer information or to make some changes to the reservation. The system will be automatic save the new information by providing a reset button and submit button.

Figure 37: Staff Edit Page

Staff search for time slot

Staff and admin are allowed to see the customer information under their reservation. They also allow viewing information or making an editing some information if customer needed. All this information will be confidential only staffs are able to see it. The admin can view customer information by login into the system by using login as admin. The system will ask for the username and password. Each of the staff will have different username and password

Figure 38 Staff View Time Slot Page

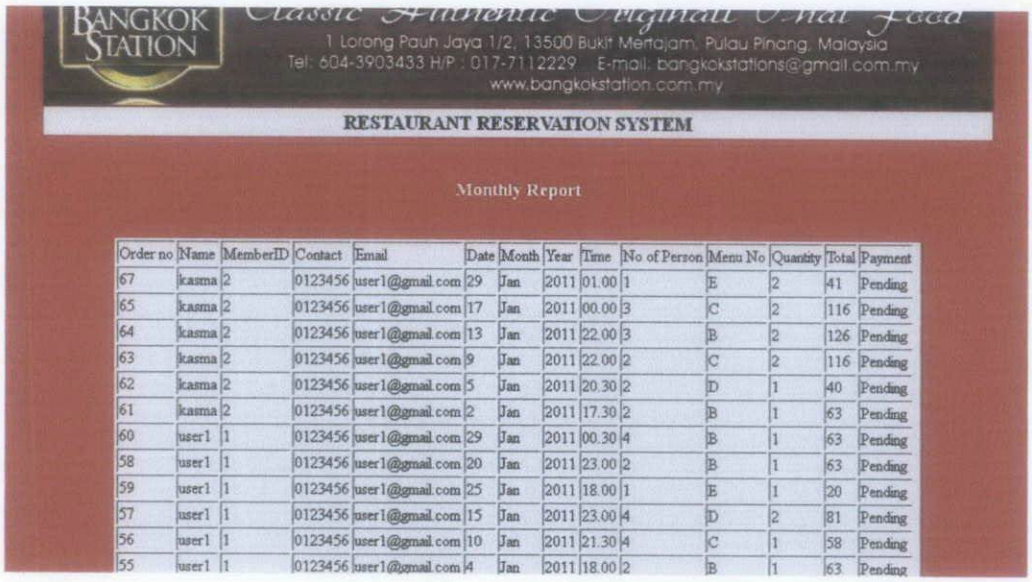
Staff Update Payment Page

Figure 39: Staff Update Payment Page

Monthly Report Page

The system provides some reporting which have been mining based on customer reservation. Before making any reservation, users need to enter some of information which require by the system to make an order. Those information need to capture and store in database for future using of mining report. The report will be available for restaurant manager to analyze the customer order behavior and for restaurant weekly or monthly transaction.

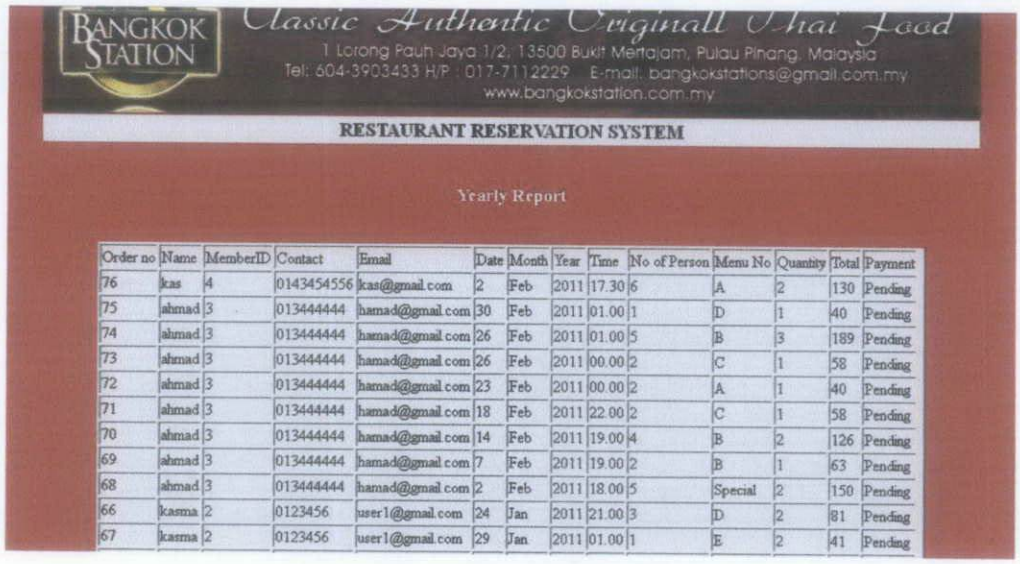
These are the examples of mining report as shown in figure bellow. It comes up with the set of information which requires for a restaurant manager to recognize customer behavior and be able to make the right decision in future for improvement of restaurant profit.



Order no	Name	MemberID	Contact	Email	Date	Month	Year	Time	No of Person	Menu No	Quantity	Total	Payment
67	kasma	2	0123456	user1@gmail.com	29	Jan	2011	01.00	1	E	2	41	Pending
65	kasma	2	0123456	user1@gmail.com	17	Jan	2011	00.00	3	C	2	116	Pending
64	kasma	2	0123456	user1@gmail.com	13	Jan	2011	22.00	3	B	2	126	Pending
63	kasma	2	0123456	user1@gmail.com	9	Jan	2011	22.00	2	C	2	116	Pending
62	kasma	2	0123456	user1@gmail.com	5	Jan	2011	20.30	2	D	1	40	Pending
61	kasma	2	0123456	user1@gmail.com	2	Jan	2011	17.30	2	B	1	63	Pending
60	user1	1	0123456	user1@gmail.com	29	Jan	2011	00.30	4	B	1	63	Pending
58	user1	1	0123456	user1@gmail.com	20	Jan	2011	23.00	2	B	1	63	Pending
59	user1	1	0123456	user1@gmail.com	25	Jan	2011	18.00	1	E	1	20	Pending
57	user1	1	0123456	user1@gmail.com	15	Jan	2011	23.00	4	D	2	81	Pending
56	user1	1	0123456	user1@gmail.com	10	Jan	2011	21.30	4	C	1	58	Pending
55	user1	1	0123456	user1@gmail.com	4	Jan	2011	18.00	2	B	1	63	Pending

Figure 40: Monthly Report Page

Yearly Report Page

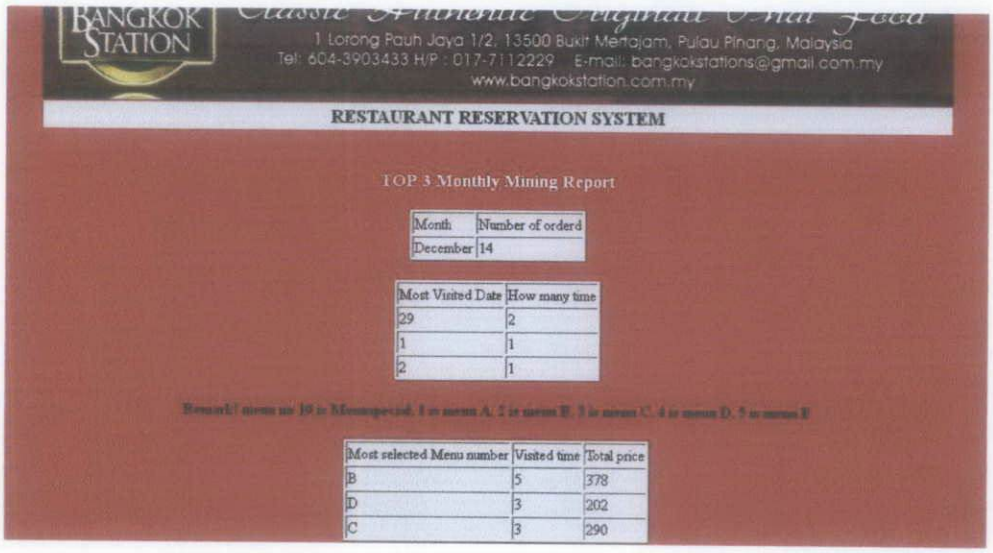


Order no	Name	MemberID	Contact	Email	Date	Month	Year	Time	No of Person	Menu No	Quantity	Total	Payment
76	kas	4	0143454556	kas@gmail.com	2	Feb	2011	17.30	6	A	2	130	Pending
75	ahmad	3	013444444	hamad@gmail.com	30	Feb	2011	01.00	1	D	1	40	Pending
74	ahmad	3	013444444	hamad@gmail.com	26	Feb	2011	01.00	5	B	3	189	Pending
73	ahmad	3	013444444	hamad@gmail.com	26	Feb	2011	00.00	2	C	1	58	Pending
72	ahmad	3	013444444	hamad@gmail.com	23	Feb	2011	00.00	2	A	1	40	Pending
71	ahmad	3	013444444	hamad@gmail.com	18	Feb	2011	22.00	2	C	1	58	Pending
70	ahmad	3	013444444	hamad@gmail.com	14	Feb	2011	19.00	4	B	2	126	Pending
69	ahmad	3	013444444	hamad@gmail.com	7	Feb	2011	19.00	2	B	1	63	Pending
68	ahmad	3	013444444	hamad@gmail.com	2	Feb	2011	18.00	5	Special	2	150	Pending
66	kasma	2	0123456	user1@gmail.com	24	Jan	2011	21.00	3	D	2	81	Pending
67	kasma	2	0123456	user1@gmail.com	29	Jan	2011	01.00	1	E	2	41	Pending

Figure 41: Yearly Report Page

Monthly Mining Report

In figure 26, a restaurant manager is able to view monthly mining report which include of Firstly, the total of reservation has been made in the particular month. Secondly, the list of the most top 3 menus frequently placed an order. Thirdly, the most top 3 of customer name who's often visited or make a reservation. Four, the specific date and time that customer used to visited. Lastly, the total growth income of restaurant in the specific particular month.



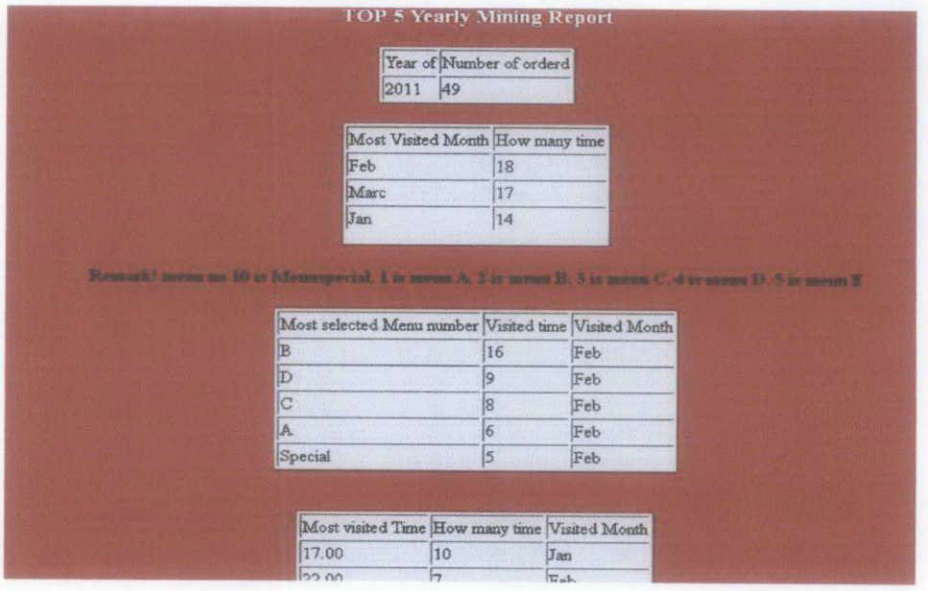
Month	Number of orderd
December	14

Most Visited Date	How many time
29	2
1	1
2	1

Most selected Menu number	Visited time	Total price
B	5	378
D	3	202
C	3	290

Figure 42 : Monthly Mining Report

Yearly Mining Report



TOP 5 Yearly Mining Report

Year of	Number of orderd
2011	49

Most Visited Month	How many time
Feb	18
Marc	17
Jan	14

Remark! menu no 10 is Menuspecial, 1 is menu A, 2 is menu B, 3 is menu C, 4 is menu D, 5 is menu E

Most selected Menu number	Visited time	Visited Month
B	16	Feb
D	9	Feb
C	8	Feb
A	6	Feb
Special	5	Feb

Most visited Time	How many time	Visited Month
17.00	10	Jan
22.00	7	Feb

Figure 43: Yearly Mining Report

4.4 The Database Uses

All the data and information in this system will be stored into a database in local host (Xampp). The main database is RRS which consists of five (5) tables; these are User, Menu, Billing, Order and summary table. Each table consists of attributes.

4.4.1 RRS Database and its attributes

Table name	Attribute
• **User**	• Username • Password • First name • Last name • Age • Gender • Address • Email • Phone number
• **Menu**	• Menu id • Menu name • Description
• **Billing**	• Billing id • Date • Time • Amount

• **Order**	• Order id • Customer name • Contact no • email • Menu name • Quantity • Separate food • Drink • Date • Time/slot • Number of person
• **Summary**	• Customer id • Customer name • Order id • Menu name • Date • Time/slot • Amount • Description

Table 2: RRS database and its attributes

4.4.1 Manual Record of Customer information

Table name	Attribute
• **User**	• First name • Last name • Age • Gender • Address • Email • Phone number
• **Order**	• Menu name • Date • Number of person

Table 3: the summary of manual table and its attributes

- **Restaurant reservation System (RRS) and current BKS manual process**

Overview

From the study of manual process on Bangkok Station restaurant, in making a reservation with the researched concept and theories, the successful implementation of Online Restaurant Reservation System (RRS) as a new proposed system for the restaurant would be highly benefit and facilitated to both customer and a restaurant manager as it could replace the manual processing and therefore it would help to decrease the consequently generated problems of time-consuming, requirement extra manpower and high cost of expenditure, etc

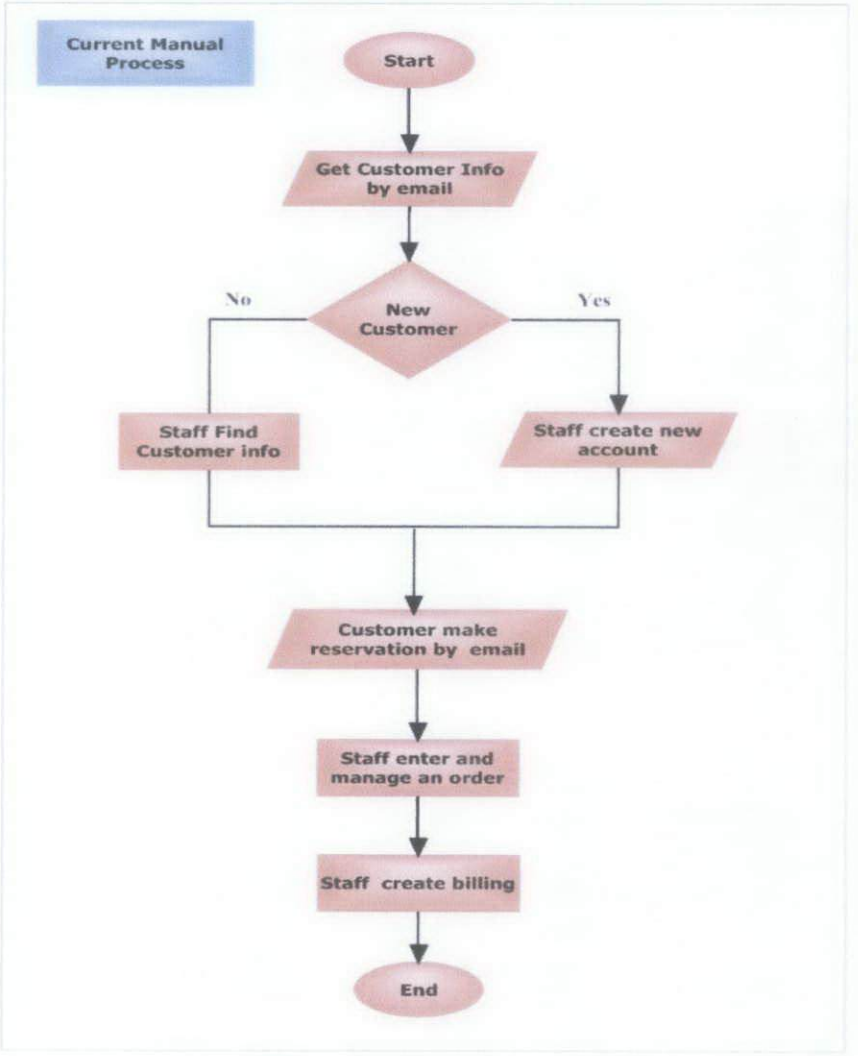


Figure 44: Flow Chart of Current manual process

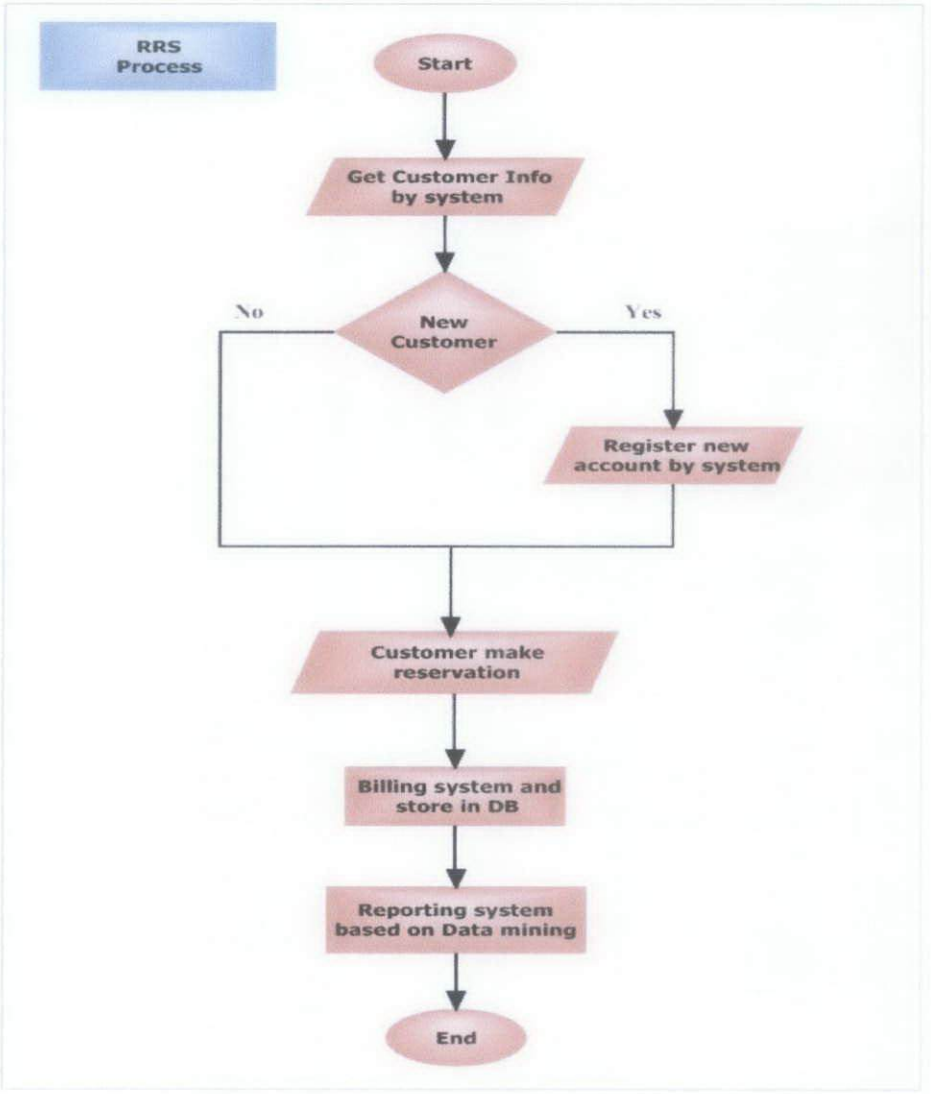


Figure 45: Flow chart of RRS

4.4.2 Comparison between RRS and current BKS manual process

Figure 45 and 8 shows the comparison between flow chart of RRS and current manual process. RRS process will start from user or customer get in to the system by accessing the internet. The system will ask user to enter user name and password. If the user is a new user then they need to create new account by entering basic information such as first name, last name, address, phone number, date of birth and age. After successful creating new account the user will able to login into the system and able to make a reservation based on available date, time slot and table. The users are freely able to search for their satisfied date and time slot. After displaying the

schedule, the system will allow user to book time slot for making a reservation. The user also allows making a changing or canceling of the their own reservation. All the process that mentioned above, the user or customer can be done at home or anyplace that access to internet, as well as any time that they want to.

Refer to the flow chart of current manual system above, start from a customer called or send email to the restaurant and then customer have to do their own an on time order without able to browsing the menu to make a reservation. Once the time of reservation arrived the staff needs to call customer for confirmation of the reservation. If the customer never been to this particular restaurant then they have to register for a member. After recorded customer information then customer will allow to make a reservation by phone or email. Once the customer has made a reservation, the staff will make a manual record of an order and create the billing for future using.

As stated above, the manual process of making a reservation is take much longer time compare with RRS. With RRS user can make a reservation regardless of time and place. It requires a few minutes and it can be done only by a finger click. Meanwhile with the current manual process the customer needs to spend more time on phone in order to make a reservation and it's might take day by waiting for an email to complete all the process. The main advantages of RRS system are reducing time, man power as well as cost of expenditure.

4.5 Client usability testing and Interview section

In this study, an interview section have been conducted several potential clients, they are restaurant operators from different restaurant around Taman Maju and Bandar University.

The interview have been done to get better understanding the project that has been developed especially on the system usefulness and conveniences for restaurant operators to run their daily business transaction.

Below are the lists of restaurant operators that have been interviewed for this project:-

1 Mr. Ahmad Abdullah

2. Mr. Abu Bakar Haji Daud

3. Mss. Fatimah Yunus

For this evaluation part in the meeting we have a short discussion as well as evaluation of the online restaurant reservation system. The client evaluation section is focus on the usefulness of the system itself. Furthermore many feedbacks and suggestions have been given based on user perception regarding the system.

For this project system, there are 2 phase of usability testing which is **Phase 1: Layout and basic function** of the system and Phase **2: The overall Function**. The reason for having 2 phases of testing is because Phase 1 is focus on the layout and the design of the system. As well as the basic function such as Login and Register. While Phase 2 focus on overall function including the making an order and reservation.

Below are some feedback received from client who had tried the system:

- Feedback 1

Name: Mr. Ahmad Abdullah

Restaurant TG Corner

'The interface is very nice, I really like the combination of the color used in the system and it easy to use'

- Feedback 2:

Name: Mr. Abu Bakar Haji Daud

Restaurant: Sabila Restaurant

'The function works well and it is easy to find the information, easy to make an order and make a reservation'

- Feedback 3

Name: Fatimah Yunus

Restaurant: Family Tomyam

'I like this system because it automated reservation that will generate the variety of useful reports for restaurant operators to do a preparation for made customers need'

In conclusion for the client usability test about the prototype of the system, overall most of them like the idea and the concept of the system in order to give the useful information by generating several kinds of reports.

4,6 **Discussion**

During developing this project, there are some problems and challenges arise and several opportunities able to be gain.

Problem/ Challenges

- During conducting an interview with clients it is very hard to fulfill the information related the quantities of the customers and reservation of each restaurant.
- Problem facing when have to develop the function system and make sure that the system can generate the report according to the data recorded.
- To find the appropriate technique and method to apply in the system.
- It is challenging in organizing the data as well as the function and the system content.

Opportunities

- Gain more knowledge and understanding in business process in term of customer making order and reservation.
- Gain more knowledge in developing the system using PHP, Dreamwaver and MySQL
- Able to make a system that will give benefits to the society
- Able to learn and analyze about the pattern of customer's behavior using data mining concept
- Get to know new people during the evaluation and interview part

CHAPTER 5

CONCLUSION AND RECOMMUDATION

5.1 Conclusion

In conclusion, Online Restaurant Reservation System Using Data Mining Concept is an automated online reservation for restaurant operators. Target users of the project are the restaurant operators and their customers. The system will increase the automation to online restaurant reservation system including analyze the business operation. From the system, the restaurant manager will be able to utilize the space and time slot for customer's reservation. Besides that, this system is mainly to make the managers noticed or identified which menu is the most and less popular menu ordered. An analysis will be generated (by using data mining concept) to help the restaurant manager to take an action further based on particular analysis. This project has met with its own objective by ease the restaurant operators to make the right decision of changing or adjustment the existing menu. By applying the concept of data mining to the normal existing restaurant online reservation will help restaurant operators identified about their customer's behavior which is the most important element that will sustain an efficiency of their business in the competitive world. This project has gone through the usability testing and the feedback receive is good. However, a few enhancement need to be done as it is to make sure the effectiveness of the system. Furthermore currently this kind of system is not available in Malaysia because the technique of mining the data on the business transaction is not an easy to make a calculation and came out with several of mining report. Hopefully this system can be implements for the sake of leaning and helpful others who are in needs. By doing this, it can help the restaurant operators to have more knowledge on the information technology in term of business planning as well as understanding on customers buying behavior.

5.2 Recommendation

Online Restaurant Reservation System Using Data Mining Concept is a transformation from existed normal online reservation system. With integration of Using Data Mining Concept it provided a viable alternative to the expensive and costly reservation system available in the market and it is an effective solution to interactively communication for both customers and restaurant operators for making business transaction.

There is recommendation to explore on the new technology in connecting people where knowledge sharing and information can be applied. Other recommendations are the developer should conduct a survey on the available potential clients to get more detail and information which will be very helpful in continuing develops the system.

As people remain the same but the technologies appear to have a vast changes in a second, tool evolve, better method and technique, procedure and process emerged and out of date or older technology will be fade away. It will continue to gives more challenges to human as technology rapidly change across the

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APPENDIX A – Questionnaires

UNIVERSITY TEKNOLOGY PETRONAS

SURVEY FOR RESTAURANT OPERATORS: ONLINE RESERVATION SYSTEM

*Your responses will be kept confidential

Name of restaurant: ☐

Branch: ☐

A. PERSONAL INFORMATION ☐

1. Name: ☐
2. Position: ☐
3. Gender: Male ☐ Female ☐
4. Age : ☐
5. Period of working/day

☐ Less than 4 hours

☐ 4 to 6 hours ☐ 6 to 10 hours

☐ 10 to 15 hours ☐ More than 15 hours

6. Working Experience in current position

☐ Less than 6 months

☐ 6 months to 1 year ☐ 1 year to 3 year

☐ More than 1 year

B. INTERNET USAGE

1. How skilled are you in the use of computer and internet?

   ☐ Very skilled

   ☐ Competent

   ☐ Not very skilled

2. Did you familiar with online restaurant reservation system?

   ☐ Familiar ☐ Unfamiliar

3. Do you think the restaurant need an online reservation system for customer's conveniences?

   ☐ Agree ☐ Not agree ☐ others

4. Do you think the sale and revenue will increased if the restaurant using an online an online reservation system?

   ☐ Agree ☐ Not agree ☐ others

5. Do you think it will be great if an online reservation system can generate the various of mining report regarding customer's behavior to your restaurant

   ☐ Agree ☐ Not agree ☐ others

APPENDIX B – System Usability Scale (SUS)

Occupation: _____ Age: _____ Date: ___/___/___

System Usability Scale
Online Restaurant Reservation System

Instructions: For each of the following statements, mark one box that best describes your reactions to the website.

		Strongly Disagree				Strongly Agree
1.	I think that I would like to use this website frequently.	☐	☐	☐	☐	☐
2.	I found this website unnecessarily complex.	☐	☐	☐	☐	☐
3.	I thought this website was easy to use.	☐	☐	☐	☐	☐
4.	I think that I would need assistance to be able to use this website.	☐	☐	☐	☐	☐
5.	I found the various functions in this website were well integrated.	☐	☐	☐	☐	☐
6.	I thought there was too much inconsistency in this website.	☐	☐	☐	☐	☐
7.	I would imagine that most people would learn to use this website very quickly.	☐	☐	☐	☐	☐
8.	I found this website very cumbersome/awkward to use.	☐	☐	☐	☐	☐
9.	I felt very confident using this website.	☐	☐	☐	☐	☐
10.	I needed to learn a lot of things before I could get going with this website.	☐	☐	☐	☐	☐

Please provide any comments about this website: